

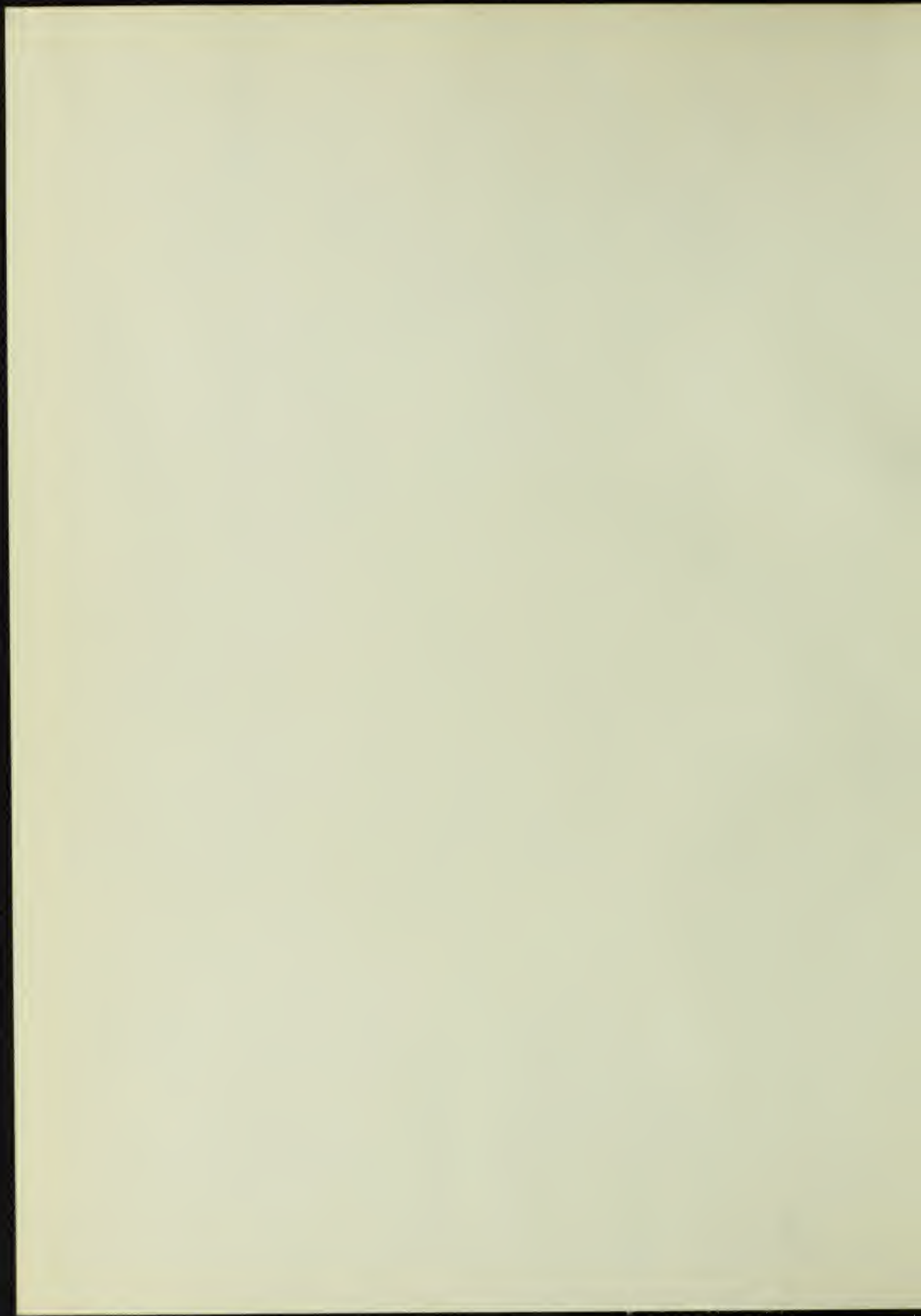


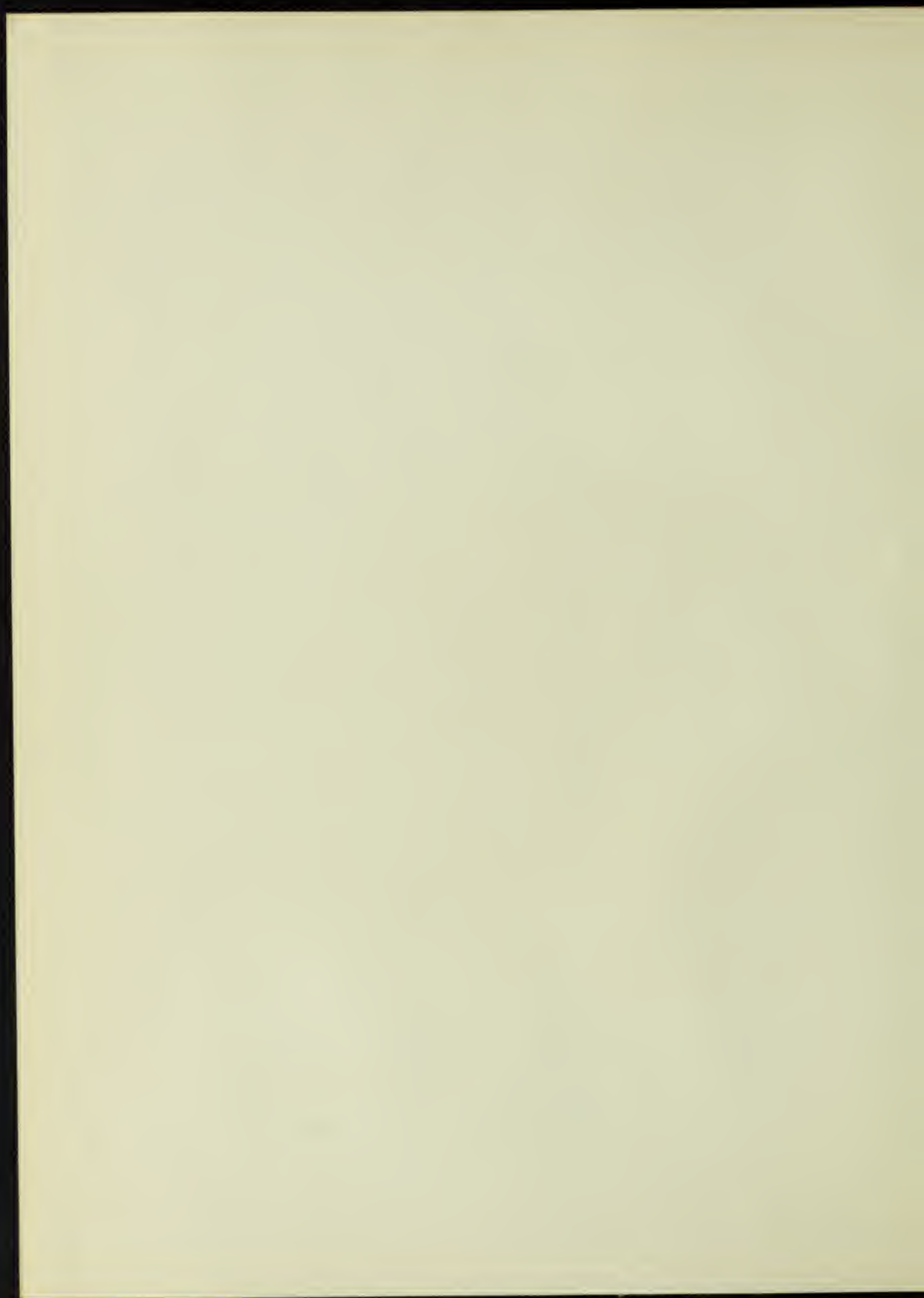
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CARCINOGENESIS

ABSTRACTS

Volume 3

1965 39

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Prepared for the
Carcinogenesis Studies Branch, National Cancer Institute,
National Institutes of Health, U. S. Public Health Service,
U. S. Department of Health, Education, & Welfare
Bethesda, Maryland

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FOREWORD

The National Cancer Institute, in response to Congressional interest and desire for a national program of cooperative research in cancer, is establishing a means whereby information in the field of carcinogenesis will be coordinated and made available. The information to be included will be obtained from the National Cancer Institute, other governmental agencies, and non-governmental research institutions.

The issuing of Carcinogenesis Abstracts under the auspices of the National Cancer Institute will provide a central source for current abstracting of the carcinogenesis literature being published throughout the world. This will help facilitate an integrated and cooperative program of investigation in this area. The growing number of publications in the area of carcinogenesis makes imperative the availability of an appropriate abstracting service so that investigators may be apprised of progress with a minimum of delay. It is our desire to provide the investigator with a readily systematized compilation of the published work.

Carcinogenesis Abstracts will be published monthly and will include abstracts from journals received primarily the month previously.

Inquiries may be addressed as follows:

Carcinogenesis Abstracts
National Institutes of Health
National Cancer Institute
Bethesda, Maryland 20014

JANUARY 1965

Abstract Nos. 1-201

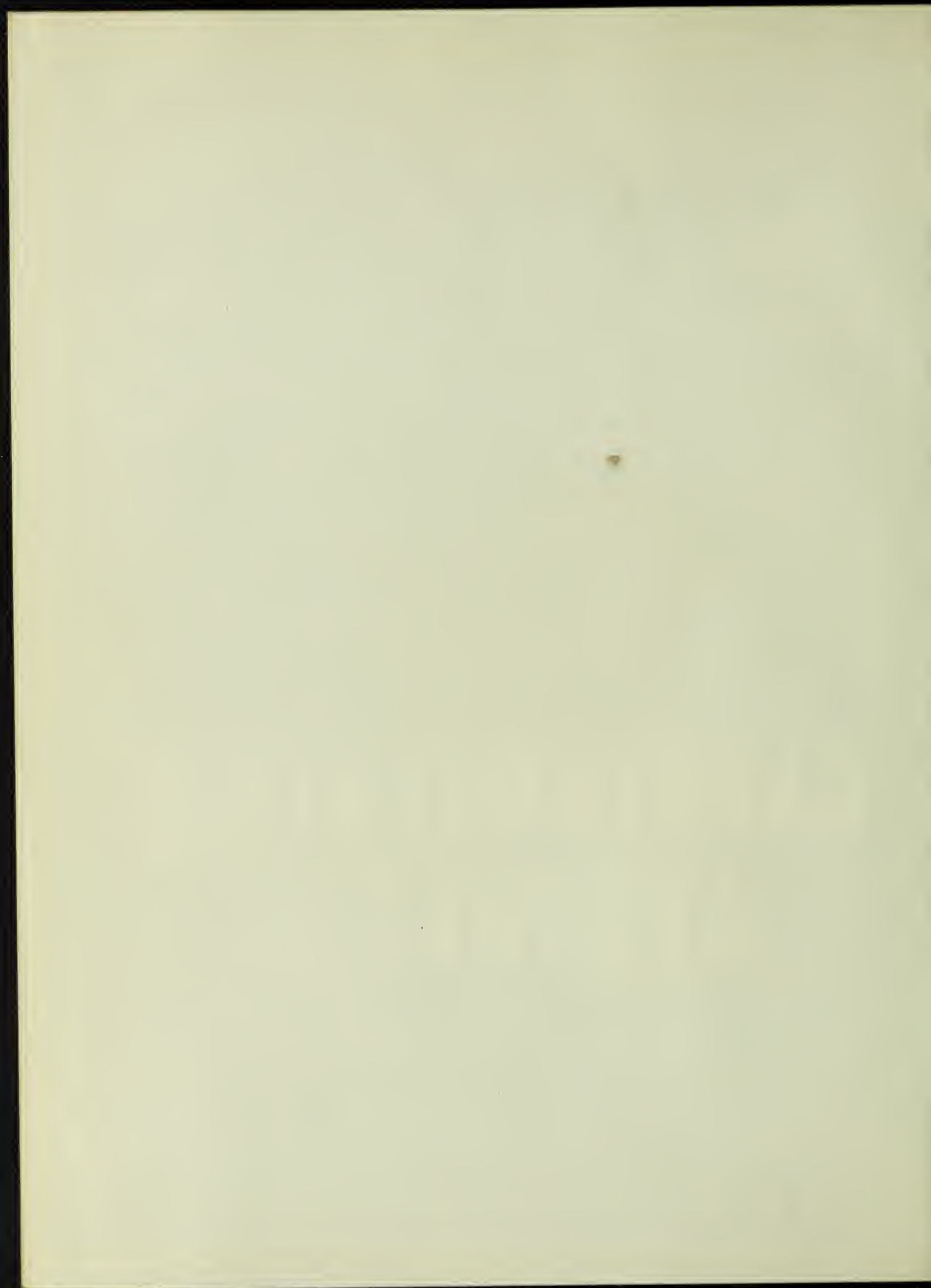


CARCINOGENESIS ABSTRACTS

National Cancer Institute

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service



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CARCINOGENESIS ABSTRACTS

Volume 3, Number 1
January, 1965

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Prepared by Medical Literature, Inc.
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For the Carcinogenesis Studies Branch
National Cancer Institute
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National Cancer Institute
Bethesda 14, Maryland

NOTE

Journal names are abbreviated according to the list of abbreviations used by Index Medicus. If the journal is not covered by Index Medicus, then the abbreviations (with some modifications) found in World Medical Periodicals, 3rd Edition, are used.

ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	Cytopathic effect	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubated(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr. Afrikaans	E. English	Hun. Hungarian	Lith. Lithuanian	Ser. Serbo-Croatian
Ar. Arabic	Eston. Estonian	Ic. Icelandic	Maced. Macedonian	Sl. Slovene
Bul. Bulgarian	Fin. Finnish	In. Indonesian	Nor. Norwegian	Sp. Spanish
Ch. Chinese	Fr. French	It. Italian	Pol. Polish	Sw. Swedish
Cz. Czech	Ger. German	Jap. Japanese	Por. Portuguese	Th. Thai
Dan. Danish	Gr. Greek	Kor. Korean	Rum. Rumanian	Uk. Ukrainian
Dut. Dutch	Heb. Hebrew	Latv. Latvian	Rus. Russian	Viet. Vietnamese

REVIEW

5-1 IONIZING RADIATION - BIOLOGICAL EFFECTS. (Dan.) Eldjarn, L., B. Lindell and J. C. Christensen. Ugeskr. Laeg. 126(16): 169-172, 1964.

An initial report of the Scandinavian Committee for Protection against Radiation Effects concludes that a linear relationship exists between total radiation dosage and leukemogenic effect, whether exposure to repeated small doses or exposure to gradually increased dosage is involved, and that the degree of individual susceptibility to radiation effect is essentially independent of age and sex. Also reported is a subcommittee's summation of safe limits (in terms of acute or myeloid leukemogenesis, induction of thyroid cancer and induction of genetic effects), based on a review of the currently available literature. (No references)

5-2 SOME ASPECTS OF THE BIOCHEMICAL STUDIES OF MALIGNANT TUMORS. (Rus.) Shapot, I. S. Zh. Vses. Khim. Obshchestva Im. D. I. Mendeleeva 8(4):373-384, 1963.

A review of literature on the biochemistry of malignant tumors with the emphasis on their autonomy, uncontrolled growth and invasiveness resulting in the death of the infiltrated normal surrounding tissues. In the study of cellular malignization subjects discussed include cell surface changes, metabolic changes that depend on the nature of the tumor, the role of the enzymes and "isozymes" (or "isozymes") and the role of cell protein synthesis. (76 references)

5-3 GENETIC INFORMATION AND THE CANCER PROBLEM. (Ger.) Hadley, H. G. (Hadley Mem. Hosp., Washington 24, D. C.). Krebsarzt 9(3):201-204, 1964.

A review on genetic information and the cancer problem is presented and includes a scheme for the genetic code or information mechanism. (21 references)

5-4 CARCINOGEN IN GROUNDNUTS. (E.) Editorial. Brit. Med. J. 2:204-205, 1964.

In a review of the carcinogenic properties of peanut meal, stress is laid upon the high incidence of liver tumors obtained experimentally in rats, ducks, mice and trout following administration of aflatoxin (A), a metabolite of certain strains of Aspergillus flavus. The recognition of A in the fungal spoilage of peanut meal and other foodstuffs merits special attention. The incidence of primary liver carcinoma is very high in parts of Africa and Asia where children are known to eat peanuts gleaned from the fields. This is of

special interest since the toxin-producing strains of A. flavus will grow only in a tropical or semitropical climate. (16 references)

65-5 ASBESTOS AND MALIGNANCY. (E.) Editorial. Brit. Med. J. 2:202-203, 1964.

In a review of the relationship between asbestosis and malignant disease, although a positive correlation was seen for various tumors (peritoneal, pleural and bronchial, mainly), this was found to be independent, in some cases, of the severity of asbestosis or the degree of exposure to asbestos dust. The probable mechanism of the carcinogenic action of asbestos (chronic irritation, content of polycyclic aromatic hydrocarbons, role of iron) is also discussed. (See also CRA 2(8):#36, 1964.) (20 references)

65-6 BIOCHEMICAL PERSPECTIVES IN CANCER RESEARCH. (E.) Potter, V. R. (McArdle Mem. Lab., U. Wisconsin Sch. Med., Madison). Cancer Res. 24(7):1085-1098, 1964.

In this extensive review, the author traces the background of cancer biochemistry through 3 main theories: Warburg's aerobic glycolysis, the hypothesis of convergence, and the deletion hypothesis. Present evidence seems to indicate that the somatic mutation theory and virus theory of carcinogenesis are not mutually exclusive; the tendency is toward a "reconciling assumption" of transmissible mutagens, that is, a heritable change in genome with or without virus recovery. Recent advances in the field of feedback controls indicate that feedback deletion (alteration) may take place with or without changes in the genome. Feedback deletion in minimal-deviation hepatomas is also discussed. (62 references)

65-7 THE EFFECTS OF IRRADIATION ON THE THYROID GLAND WITH PARTICULAR REFERENCE TO THE INDUCTION OF THYROID NEOPLASMS: A REVIEW. (E.) Lindsay, S. (Dept. Path., U. California Sch. Med., San Francisco) and I. L. Chaikoff. Cancer Res. 24(7):1099-1107, 1964.

In an extensive review of the effects of irradiation on the thyroid gland, the authors discuss radiation-induced degenerative lesions in the thyroid, radiation-induced thyroid neoplasms in the rat and other animals, the appearance of thyroid nodules in children following ¹³¹I therapy, and the relation of irradiation of the head and neck region to the development of thyroid carcinomas in children and adults. (92 references)

65-8 THE EXPERIMENTAL BASIS FOR CARCINOGENICITY TESTING. (E.) Berenblum, I. Excerpta Med. (Ser. LXXV) 3:7-14, 1964.

In an introductory address, the author presents some basic principles of carcinogenesis and lists the various known categories of potential carcinogens for man. In a discussion of testing for carcinogenicity of drugs, "modifying factors" influencing the response to carcinogens and co-carcinogenic action are considered among the difficulties encountered in testing systems. The author stresses that a very high proportion of human cancer is attributable to extrinsic, rather than intrinsic factors, and that such cases are therefore potentially preventable. (No references)

- 65-9 CIRCUMCISION AND CERVICAL CANCER. (E.)
Editorial. Brit. Med. J. 2:397-398,
1964.

In a review of the possible relationship between circumcision and cervical cancer, it is concluded that personal hygiene, rather than circumcision alone, should be recommended as a means of prevention of cervical cancer. The carcinogenicity of smegma has not been proven and its presence seems to be only a sign of poor hygiene, the principal factor increasing the risk of both penile and cervical cancer. (21 references)

- 65-10 INTERNATIONAL CONFERENCE ON THE EPI-
DEMOLOGY AND PATHOLOGY OF OROPHARYNGEAL
TUMORS. (Rus.) Nugmanov, S. N. (Kazakhstan Inst.
Oncol. Radiol., Alma-Ata, USSR). Vop. Onkol.
10(7):123-124, 1964.

The participants of a WHO-sponsored conference in New Delhi, in October, 1963, reported on the epidemiology of oropharyngeal tumors. In India they comprise 50% of all malignancies and are attributed to smoking, anemia, avitaminosis, etc. Cancer of the palate is more frequent here in females who practice inverted smoking. Experiments indicate that cigarette smoke is only an early contributing factor; heat actually favors the process of carcinogenesis. In South Africa tumors of the oral cavity are more frequent in males, and they occur without predilection for white or native population. In Japan gastric cancer is attributed to salty foods and insufficient milk consumption; the mortality is higher in females of low socioeconomic classes. Overall, the rate of gastric cancer among various races depends on their eating habits. (No references)

- 65-11 REVIEW. ON A UNIFYING CONCEPT OF
CANCER. (E.) Brody, L. (Ctr. Safety
Educ., New York U., N. Y.). Life Sci. 3(8):
917-928, 1964.

It is suggested in this paper that the common denominator or critical phenomenon in carcinogenesis resides in the inadequacy of oxygen (O_2) supply and utilization at the cellular level. This is illustrated by numerous facts: high-pressure oxygenation is helpful in cancer control;

reduction of O_2 requirements of tissues, within limits, tends to counteract stress reactions that interfere with normal metabolic functions; a low cancer incidence is found in organs where O_2 is used efficiently, while a high incidence is seen in aerobic organs; a greater incidence of cancer is found in diabetics since in this disease hypoxia aggravates metabolic difficulties; malignant tumors may be more frequent at high altitudes. The roles of viral causation, ionized air and DNA involvement are also discussed. (20 references)

- 65-12 QUICK EXPERIMENTAL AND BIOLOGICAL METHODS
FOR THE DETERMINATION OF CARCINOGENIC
EFFECTS OF CHEMICAL COMPOUNDS. (Rus.) Linnik,
A. B. (Inst. Exp. Clin. Oncol., Acad. Med. Sci.
USSR, Moscow). Vop. Onkol. 10(4):100-109, 1964.

A review of the literature is presented on various methods used to test the carcinogenic effect of chemicals. In general there are 2 types of test systems in use; i.e., study of the direct effect of agent on various forms of life, and the study of the indirect effect (such as that resulting in subsequent generations). Charts, depicting some agents (benzpyrene, DMBA, methylcholanthrene, β -naphthylamine, o-aminazotoluene), routes of their admin., duration of the experiment and hosts used are included. (134 references)

- 65-13 SCIENCE AND CANCER. Public Health Serv.
Publ. No. 1162. Shimkin, M. B. U.S.
Dept. Health, Education, Welfare, Washington, D. C.
1964, 137 pp.

An interesting review for the general reader is presented of the epidemiology of cancer, its frequency in certain areas of the world as well as in certain sites in the body, and the nature of carcinogens, including chemicals, radiations and viruses. Cell biochemistry, physiology and genetics, immunity and chemotherapy are also briefly reviewed. (26 references)

- 65-14 BACTERIOSTATIC CHEMOTHERAPEUTIC AND
MALIGNANT TUMOR GROWTH; A BRIEF REVIEW
OF BACTERIOSTATIC CHEMOTHERAPEUTIC WITH REFERENCE
TO THE PROMOTION OF MALIGNANT TUMOR GROWTH. (E.)
Hirata, M. (Hiroshima U. Sch. Med., Japan).
Hiroshima J. Med. Sci. 12(2):83-88, 1963.

The author reviews the clinical and experimental data illustrating the relationship between bacteriostatic chemotherapeutic agents and malignant tumor growth. In humans, agents like isonicotinic acid hydrazide (INH), streptomycin (SM), penicillin (PC) and chloramphenicol (CM) seem to be responsible for a variety of changes ranging from abnormal proliferation and metaplasia to advanced malignant disease. Enhancement of tumor growth was seen in various animals as a result of admin. of such chemotherapeutic agents as SM, PC, CM, aureomycin, terramycin, p-aminosalicylic acid, and INH. (26 references)

- 15 FAMILIAL LEUKEMIA. (Ger.) Editorial.
Deutsch. Med. Wschr. 89(28):1355-1356,
1964.

brief review of literature on familial leukemia presented. (16 references)

- 16 SMOKING AND THE BRONCHI. DISCUSSION OF
STUDIES AND DEBATES CONCERNING THE
CURRENT PROBLEM. (Sw.) Birath, G. Kvart.
Svenska Nat.-Fören. Hjärt-o. Lungsjuk 59(2):
1-39, 1964.

general discussion of the known effects of
cigarette smoke on the bronchi and alveoli is
followed by a review of the literature concerning
cigarette smoking and bronchogenic carcinoma.
(10 references)

- 17 SMOKING AND CANCER. (PERSONAL OBSER-
VATIONS REGARDING THE REDUCTION OF THE
DANGERS PRODUCED BY SMOKING.) (Gk.)
Poutatzis, D. Bull. Med. Soc. Thessalonika June
1962:452-458.

review is presented on the relationship between
smoking and lung cancer. The author believes that
the malignant degeneration of the bronchial epi-
thelium is not caused solely by the 3,4-benzpyrene
but also by the chronic irritation (small burns)
produced by the burning carbon particles. For
the reduction of the high incidence of lung cancer
he suggests the use of a "freezing type pipe"
designed by him in 1961, barring of all smoking
before the age of 30 and removal of the wax coat-
ing of the tobacco leaf. (No references)

- 18 CARCINOGENESIS. (Jap.) Endo, H.
(Cancer Res. Inst., Kyushu U. Sch.
Fukuoka, Japan). Nippon Ishikai Zasshi (J. Jap.
Cancer Assn.) 49(2):159-164, 1963.

In this paper the author reviews some of the
current approaches to the elucidation of mecha-
nisms involved in carcinogenesis by various agents
including viruses. Stress is laid upon methods
which lend themselves to the qualitative and
quantitative differentiation of normal from cancer
cells. (No references)

- 19 SURFACE PROPERTIES OF NORMAL AND TUMOR
CELLS. (Rus.) Vasil'ev, Iu. M. and
G. Malenkov. Zh. Vses. Khim. Obshchestva
Mendeleeva 8(4):394-402, 1963.

In this review the authors discuss the general
properties on cell surface, the adhesive properties
of normal cells, and the peculiarities of tumor
cell surfaces. They conclude that the surfaces
of the malignant cells differ in their physical
and chemical properties from normal cells. Bi-
ologically, they are independent from the control

mechanisms (such as specific hormones) regulating
the growth of normal cells, but in the process
of carcinogenesis not only the external membrane
but also endocellular membranes undergo the
changes as well. (121 references)

- 65-20 NEW ON THE THEORIES OF CARCINOGENESIS.
RECENT CONCEPTS OF CARCINOGENESIS.
(Rus.) Vasil'ev, Iu. M. Zh. Vses. Khim.
Obshchestva Mendeleeva 8(4):362-372, 1963.

In this review of literature the author discusses
the general mechanisms of carcinogenesis, its
phases, the relation of the structure of chemical
carcinogenic agents to their action, the carcin-
ogenic properties of foreign body implants and
of viruses, the metabolism of carcinogens in the
organism, and spontaneous cellular malignant
change in tissue cultures. Most of the assump-
tions on the mechanisms of carcinogenesis involve
irreversible changes; many of the mechanisms com-
plement each other, and, more probably, an actual
combination of various processes take place.
The mutagenic action of a carcinogenic agent could
lead to an accumulation of various hereditarily
changed cellular variants, which then could serve
as material for further selection. Progression
to tumor can apparently be accomplished in various
ways in different cases and all theoretically pos-
sible combinations may not be found. It is most
important to analyze the nature of genetic changes
in different types of carcinogenesis and at dif-
ferent stages. (69 references)

- 65-21 CYTOGENETICS OF TUMORS. (Rus.)
Pogosiants, E. E. Zh. Vses. Khim.
Obshchestva Mendeleeva 8(4):449-458, 1963.

A review of literature on cell cytogenetics places
emphasis on new methods employed in the study of
cell structure and the use of new types of trans-
plantable rat and mouse tumors. Karyotype and
chromosome studies are presented of human cells,
of transplantable tumors, of cell populations
in vitro, and especially of cells in human myeloid
leukemia pts. These studies indicate that the
chromosome alterations, if not responsible for the
malignancy, are at least connected with it. Un-
doubtedly, the cytological studies of early cancer
stages or precancerous conditions will clear up
the role of genetic cell changes in the mechanisms
of tumor growth. (101 references)

- 65-22 ULTRA-VIOLET LIGHT AND SKIN CANCER.
(E.) Klinkhamer, H. A. W. (N. V. Philips
Gloeilampenfabrieken, Eindhoven, Netherlands).
Med. Mundi 9(3/4):77-81, 1964.

A review of statistical data shows that: skin
cancer occurs more frequently at high altitude,
in sunny, dry regions than in less sunny regions;
skin cancer (particularly basal cell or squamous
cell carcinoma) involves more frequently the skin

areas exposed to sunlight than those covered by clothing; skin cancer more often affects people with a light complexion than those with a dark one; the incidence of skin cancer is greater in people whose occupation keeps them in the open air; irradiation with UV light produces skin cancer in 100% of white mice. Skin cancer manifests itself most frequent after the age of 60. The increase in the natural probability of developing skin cancer caused by irradiation with artificial sources of UV light is negligible, provided such irradiation is applied in moderation. (10 references)

- 65-23 THE CARCINOGENIC ACTION OF OESTROGENS IN MAN. (E.) Marois, M. Excerpta Med. (Ser. LXXV) 3:83-99 and 68-82, 1964.

A detailed review of the carcinogenic action of estrogens in experimental animals and humans is presented. Correlations between endometrial carcinoma and hyperfolliculinism or estrogen (secreted or admin.) are reviewed. Statistical considerations, clinical data, and experimental studies show a correlation between high estrogen levels and carcinoma of the cervix, as well as synergism between estrogen and methylcholanthrene. Contradictory actions of estrogen in reference to mammary carcinoma are reviewed. It was concluded that under certain conditions, estrogens are carcinogenic, and that they tend to promote already existing carcinogenic processes, although they may also sometimes be anticarcinogenic. Prudence in estrogen admin. is indicated at present. (Approx. 392 references)

- 65-24 HUMAN LEUKEMIAS AND VIRUS. (Ger.) Editorial. Deutsch. Med. Wschr. 89(36): 1717-1718, 1964.

A brief review of the inconclusive evidence of the viral etiology of human leukemias is presented. (18 references)

- 65-25 CHROMOSOMES AND LEUKEMIAS. (Fr.) Bernard, J. (Saint-Louis Hosp., Paris) and J. Tanzer. Bull. Assn. Franc. Cancer 51(1): 7-24, 1964.

In an extensive review of chromosomes and leukemia, the author reports on chromosomal anomalies found in various leukemias and the frequency of leukemia in subjects with constitutional chromosomal anomalies. The principal chromosomal anomalies associated with leukemia are: the Philadelphia chromosome in chronic myeloid leukemia; anomalies of chromosomes 6-12-X, 13-15 and 21 in acute myeloid leukemia; chromosome 2 anomalies in Burkitt's tumor and Waldenström's macroglobulinemia. Examples in the literature are cited of leukemia and other cancers appearing in subjects

with mongolism or other diseases with chromosomal anomalies. Also reviewed are experimental studies on chromosomes in animals with cancer and leukemia, as well as on chromosomal aberrations induced spontaneously or by radiation, antimetabolites, alkylating agents and viruses. (No references)

- 65-26 THE ESTROGEN CANCER MYTH. (E.) Wilson, R. A. (Methodist Hosp. Brooklyn, N. Y.). Clin. Med. 71(8):1343-1352, 1964.

A review and discussion based on the experiences of the author and other investigators purporting to dispel the myth that estrogen is carcinogenic in women. It is stated in fact that estrogen admin. actually offers hope of diminishing the incidence of malignant lesions including mammary and genital cancer, whatever the causative factors. (26 references)

- 65-27 METHODOLOGIC EXPLORATIONS IN EXPERIMENTAL RESPIRATORY CARCINOGENESIS. (E.) Hueper, W. C. (NCI, Bethesda). Arzneimittelforschung 14(7):814-822, 1964.

Recognized and suspected environmental and occupational respiratory carcinogens and cancers (human), verified in various species, are tabulated. Direct bioassay methods of respiratory carcinogens (by inhalation, intratracheal instillation or insufflation, pulmonary tissue implants, and intrapleural introduction) are reviewed. The effects of indirect admin. of respiratory carcinogens (by i.v., i.p. or p.o. route) are also reviewed and discussed. Polyetiology of lung cancer is stressed, emphasizing that curbing cigarette consumption is not sufficient, and that the public must become aware of the numerous environmental respiratory carcinogens which may enter the organism by various respiratory and non-respiratory routes. Thus, thorough bioassays of chemicals being introduced into the human environment are assuming an increasing importance in carcinogenesis. (See also CRA 1(11):#1856 and #1865; and *ibid.*, 2(2): #182, 1964.) (113 references)

- 65-28 MODERN ASPECTS ON THE MECHANISM OF MALIGNANT GROWTH. (Jap.) Sugimura, T. (Dept. Biochem., Nat. Cancer Ctr., Japan). Gan No Rinsho (Jap. J. Cancer Clin.) 10(2):85-90, 1964.

The author reviews modes of participation of various DNA-connected enzymes in the transformation of a non-proliferating process to a proliferating process in normal and regenerating liver cells. He emphasizes the participation of similar enzymes in malignant cell growth and contends that the modes of enzymatic participation are essentially controlled by genetic factors in the cells. (24 references)

PHYSICAL CARCINOGENESIS

5-29 ROLE OF MOUSE LYMPHOMA VIRUS AND
MODIFYING EFFECTS OF THYMECTOMY IN
DUCTION OF MYELOID LEUKEMIA BY X-RAY.
(Jap., Abstract) Yokoro, K. (Res. Inst. A-Bomb
Surv., Hiroshima U., Japan), H. Umisa and A. Kunii.
Nippon Ketsueki Gakkai Zasshi (Acta Hemat. Jap.)
(3,4):389-390, 1963.

Groups of Rf male mice (64-106 animals in each
group) were subjected to various treatments, alone
or in combination: X-irradiation (X; 300 r x 1);
virus "passage A virus" (V; i.p. 0.2 cc of sus-
pension); thymectomy (T; 2 wk. prior to V or X).
The incidence of myeloid leukemia (ML) and thymic
lymphatic leukemia (TLL) in the X group was 10.4%
and 30.2%, resp. In the V only group, incidence
was 0% and 11.3%, resp. In the group V with X
immediately after inoc., incidence was 34% of ML.
X completely inhibited TLL leukemia in the V
and/or X groups. On the other hand X + T led to
higher incidence of ML, from 10.4 to 28%.

5-30 COMPARATIVE EFFECTS OF HYDROCORTISONE
AND X-IRRADIATION ON LEUKEMOGENESIS IN
MICE. (Fr.) Duplan, J.-F. (Pasteur Lab.,
Institut Curie, Paris). C. R. Soc. Biol. (Paris)
282(2):228-230, 1964.

Complementing previously reported studies of
factors influencing spontaneous leukemogenesis in
mice (see CRA 1(1):#96; ibid., 1(7):#1331, 1963;
and ibid., 1(12):#2070, 1964), AKR mice of both
sexes, aged 40 days, received cortisol i.m., 0.5
mg/d x 6, followed by whole-body X-irradiation on
day 65 ± 5 and then, 18 hr. later, by i.v. inj. of
10⁷ cells isologous bone marrow from normal, 40-50
day-old, donors. Tabulated were (1) the number
surviving more than 190 days; (2) the percentage
of these which developed spontaneous lymphatic
leukemia; (3) the mean survival time (days) among
leukemic mice and (4) that among non-leukemic
mice, as follows: 20, 45, 371 and 436, resp.
Comparable tabulations for untreated controls
were: 143, 78, 291 and 585, resp.; for mice re-
ceiving cortisol alone: 22, 73, 332 and 457,
resp.; for mice receiving X-irradiation + bone
marrow from normal donors: 16, 25, 265 and 361,
resp.; for mice receiving X-irradiation + bone
marrow from donors pretreated with cortisol: 20,
286 and 368, resp. The author concludes
that whole-body X-irradiation reduced the inci-
dence of spontaneous leukemias significantly,
while cortisol tended to prolong the mean survival
time of animals developing leukemia without ap-
preciably affecting the incidence of the disorder.
The effect of cortisol was approx. equal in both
sexes; that of X-irradiation was somewhat greater
in males.

5-31 AN ESTIMATION OF THE BIAS IN RETRO-
SPECTIVE STATISTICAL ANALYSIS. DISCUS-
SIONS ON THE AGE OF LEUKEMIA ONSET IN ATOMIC

BOMB SURVIVORS IN HIROSHIMA. (Jap.) Watanabe, M.
(Dept. Epidemiol., Hiroshima U., Japan). Hiroshima
Igaku (J. Hiroshima Med. Assn.) 16(8):713-718, 1963.

Statistical analyses were performed on a total of
202 subjects who were exposed to atomic bomb ex-
plosion in Nagasaki or in Hiroshima and who later
developed leukemia (71 males and 29 females of
Nagasaki; 67 and 55, resp., of Hiroshima). Factors
analyzed included city, sex, age at exposure, dis-
tance from the hypocenter, and age at onset of leu-
kemia. From statistical manipulations (which are
discussed in detail) it is concluded that the dif-
ference in ages at onset between females in
Nagasaki and females in Hiroshima was greater than
the difference in ages of males from the two cities
at onset of leukemia. Both males and females com-
bined developed leukemia at younger ages in Nagasaki
than in Hiroshima. If the factor of city were
eliminated, females developed leukemia at younger
ages than males.

65-32 FIFTY-FOUR CASES OF SKIN AND NECK CANCER
FOLLOWING RADIATION THERAPY FOR BENIGN
DISEASES. (Jap.) Takahashi, S. (Dept. Radiol.,
Nagoya U. Sch. Med., Japan) and T. Kitabatake.
Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta
Radiol.) 23(10):1303-1311, 1964.

Among 10835 malignant tumors collected between
1961-1962 in Japan, 61 developed in areas which
received therapeutic irradiation. The ratios of
the number of radiation-induced cancers to the
total number of cancers were: 14/308 for skin,
29/638 for thyroid, 11/906 for neck, 3/1806 for
uterus, 1/387 for maxillae cancer, 1/1983 for
stomach, 1/96 for ovary, 1/160 for bladder, 10/446
for malignant lymphoma, 6/423 for leukemia, and
0/3682 for other cancers. The male:female sex
ratio was approx. the same as in spontaneous cancer.
The latent periods ranged between 3-47 yr., the
av. was 20 yr. The latent period tended to in-
crease with decrease in radiation dose.

65-33 PRESENT STATUS OF PERSONS IRRADIATED
FOR VARIOUS BENIGN DISEASES IN THE PAST:
A PROSPECTIVE SURVEY. (Jap.) Koga, S. (Dept.
Radiol., Nagoya U. Sch. Med., Japan). Nippon Igaku
Hoshasen Gakkai Zasshi (Nippon Acta Radiol.)
23(10):1265-1270, 1964.

Among 826 pts. irradiated for various benign
diseases between 1940-1946, follow-up by means of
a questionnaire in 1962 was obtained for 384.
Average elapsed time since irradiation was 18 yr.
(range 15-21 yr.). One pt. developed cancer (of
the biliary tract) 15 yr. after irradiation of the
abdomen; this pt. had suffered from gastric ulcer.
It was concluded that this type of prospective
study has no epidemiological value.

- 65-34 INCIDENCE OF MALIGNANT TUMOUR OF THE PELVIC ORGANS IN PATIENTS PREVIOUSLY IRRADIATED FOR BENIGN GYNAECOLOGICAL LESIONS. (E.) Corinaldesi, A. (Dept. Radiol., U. Bologna, Italy) and C. Rimondi. Panminerva Med. 6(5): 165-170, 1964.

Of 398 pts. subjected to pelvic irradiation at the Bologna Radium Inst. between 1935 and 1957 for benign gynecologic disease, 7 were found to have died from malignant tumor of the pelvic organs. The age range of pts. with malignancy was 52-71 yr.; treatment included X-irradiation (1,500-4,800 r) alone or in combination with radium (59.22-71.06 mC; 2 pts.). The interval from treatment to diagnosis of malignancy ranged from 5-20 yr. The frequency of malignant pelvic disease in the irradiated group and in women who died at the same age, but who had never received radiation treatment, is not significantly different.

- 65-35 INDUCTION OF RESISTANCE AGAINST ISO-TRANSPLANTANTS OF UV-INDUCED MOUSE SARCOMAS. (Ger.) Graffi, A. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin, Berlin-Buch), G. Pasternak and K.-H. Horn. Acta Biol. Med. German. 12(6):726-728, 1964.

After daily UV irradiation, inbred strain XVII/Blm mice developed s.c. UVT-14306 and UVT-15264 sarcomas. For immunization, irradiated tumor tissue (0.2 ml of a 1:4 dilution of a cell suspension) was inj. s.c. at 14-day intervals. The effect of immunization was tested with fixed cell doses admin. 3 days after the last inj. of irradiated tissue. After immunization with UVT-14306 and test dose of 2×10^4 or 5×10^4 UVT-14306 cells, 6/10 or 5/10, resp., were resistant as compared to 4/10 or 2/10 controls, resp. After reimplantation with 105 cells the induced resistance was even more pronounced: 16/16 treated were resistant compared to 1/10 controls. After immunization with UVT-15264 and a test dose of 2×10^4 UVT-15264 cells, 28/29 treated mice were resistant compared to 6/20 controls.

- 65-36 DIFFUSE MESOTHELIOMA AND EXPOSURE TO ASBESTOS DUST IN THE MERSEYSIDE AREA. (E.) Owen, W. G. (Broadgreen Hosp., Liverpool, England). Brit. Med. J. 2:214-218, 1964.

When the records of 16 pts. with diffuse pleural mesothelioma and 1 with diffuse peritoneal mesothelioma were investigated carefully (including histologists' reports concerning tumor tissue obtained at thoracotomy and/or autopsy), 12/17 were found to have clear histories of exposure to asbestos dust, with the first known exposure occurring 13-66 yr. prior to the onset of illness (av., 38.5). The total duration of known exposure ranged from 5-55 yr. The interval between the termination of exposure and the diagnosis of tumor ranged from a few mo. to 40 yr. In 2 of

the remaining 5 pts., asbestos bodies had been demonstrated in sections of lung tissue; the other 3 had all been employed in places where they might have handled asbestos.

- 65-37 CORRELATION OF SOME EFFECTS (CARCINOGENIC, TUMEFACIENT AND LIFE SHORTENING) DURING THE ACTION OF IONIZING RADIATION. (Rus.) Smirnov, R. V. (Cent. Res. Inst. Med. Radiol., USSR Ministry Publ. Health, Moscow). Med. Radiol. (Moskva) 9(7):32-37, 1964.

The effect of single gamma irradiation (100-800 r) was studied in 3-month-old random bred female mice. Mammary gland tumors (MT) appeared in 1.7-3% with an av. latent period of 4-16 mo. as compared to 2.3% and 16.5 mo., resp., in controls. Myeloid leukemia (ML) developed in 3.8-12.8% with 5.1-11.1 mo. av. latent period, as compared to 2.9% and 18 mo., resp., in controls. Av. latent period for ovarian tumors (OT) in controls was 15.5 mo., and for pulmonary adenomas (PA) 18.8 mo., as compared to 12-14.5 and 14-16.8 mo., resp., in irradiated mice. Similarly, 3.8% controls developed OT and 8.6% PA, while irradiated group had an OT incidence of 9.3-46.5% and PA incidence of 3-9.3%. Average survival time was 415 days in controls and 81-356 days in treated mice. No correlation was found between the tumor accelerating effect (i.e., acceleration of processes which led to the formation and development of neoplasms) and tumefacient effect. The former effect was found in ML and MT, and the latter in ML and OT. This indicates the independence of these aspects of the biological action of ionizing radiation.

- 65-38 IRRADIATION DAMAGES AND TUMOR DEVELOPMENT FOLLOWING THOROTRAST PYELOGRAPHY. (Ger.) Laetsch, F. (Dept. Urol., Franziskus Hosp., Aachen, Germany) and W. Klug. Zschr. Urol. 57(7):505-506, 1964.

Thirty yr. after Thorotrast pyelography (TP), a 47-year-old woman developed a diffuse squamous cell carcinoma of the kidney with indications of malignant transformation in the renal pelvis (diagnosed at surgery). Two yr. later she showed small spotty rib metastases of glandular carcinoma type. Another woman, age 51 yr., who had TP about 30 yr. previously, showed Thorotrast residues in both kidneys with severe functional disturbance and a suspicion of malignant kidney degeneration.

- 65-39 H³-THYMIDINE AUTORADIOGRAPHIC STUDIES ON CYTOKINETIC RESPONSES TO X-RAY IRRADIATION AND TO THIO-TEPA IN THE NEURAL TUBE OF MOUSE EMBRYOS. (E.) Fujita, S. (Dept. Path., Kyoto Fritsu Coll. Med., Japan), M. Horii, T. Tanimura and H. Nishimura. Anat. Rec. 149(1): 37-48, 1964.

The cytokinetics of the matrix cells of the telen-cephalon were studied in embryos obtained from

normal CF1 mice which were treated with H³-thymidine (H³-T; 3.5-7.0 μ C/g body wt.) at 10 days post-conception. Proliferating matrix cells, but not neuroblasts, were damaged in the neural tubes of embryos from mice X-irradiated (200 r) 2-4 hr. before the admin. of H³-T. The flow of matrix cells through the cell cycle was temporarily blocked by radiation during the late post-synthetic resting time, causing a subsequent decrease in the number of mitotic and DNA synthetic cells. Some of these cells degenerated and were eliminated from the matrix layer. Treatment with thio-tepa (5 μ g/g) 2-4 hr. before treatment with H³-T caused a slight prolongation of postsynthetic resting time but did not significantly influence the proliferative process in the neural tube.

65-40 TWO SARCOMAS OF THE EXTREMITIES INDUCED IN MONKEYS. (Rus.) Krotkina, N. A. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) and E. M. Barabadze. Vop. Onkol. 10(4):87-92, 1964.

Implantation of RaBr₂ (21.8 μ C, γ -activity) into the tibial canal of male Rhesus monkeys (approx. age 6 yr.) led to tumor formation 5 yr. and 2 mo. later. The tumor was related to osteogenic and osteolytic sarcoma or myeloblastoma. Multiple metastases occurred to the lung, pleura, ribs and diaphragm. Autotransplants were successful in the 1st generation but s.c., i.m. and intratibial homotransplantation to 5 young irradiated Rhesus monkeys failed. RaBr₂, 13.3 μ C into the tibial canal of a male "pavian" Abyssinian baboon (age 1 yr. and 9.5 mo.), gave rise to polymorphocellular sarcomas with no metastases approx. 7 yr. later. Both species also received 20-methylcholanthrene (15-50 mg x 2-4) at various time intervals; the baboon was also irradiated (approx. 400 r). While the radium gave rise to tumors in 4 Rhesus monkeys within approx. 2-6 yr., only 1/6 of treated baboons developed a tumor.

65-41 RADIATION-INDUCED LEUKEMIA IN GERM-FREE MICE. (E.) Pollard, M. (Lobund Lab., Notre Dame, Ind.) and T. Matsuzawa. Proc. Soc. Exp. Biol. Med. 116(4):967-971, 1964.

Following admin. of whole-body X-irradiation (150 r) at weekly intervals for periods ranging from 93-305 days, 1-month-old germfree and conventional mice of various strains showed the following lymphatic leukemia incidence: 5/7 and 1/16, resp., for C57BL; 11/18 and 27/64, resp., for C3H; 9/27 and 3/21, resp., for Swiss-Webster strains. Cytoplasmic viral inclusions were noted by electron microscopy in cells from the enlarged thymus glands. It is concluded that the occult leukemogenic agent was perpetuated in successive generations of mice by "vertical" passage through the ovum or placenta. (See also CRA 2(6):#1049, 1964.)

65-42 MALIGNANT TUMORS OF RAT INTESTINE FOLLOWING THE PROLONGED PASSAGE OF STRONTIUM-90 THROUGH THE GASTROINTESTINAL TRACT. (Rus.) Lavrent'ev, L. N. (Leningrad Res. Inst. Radiol. Hygiene, USSR). Vop. Onkol. 10(1):7-11, 1964.

White male rats (wt. 150-160 g) received strontium-90 (8 x 10⁻³ μ C/day) by gastric intubation (total absorption by bone was about 550 rads). Of 200 animals treated, 55 died within 5-24 mo.; in 13 malignant tumors of the large intestine were found. As a rule, the tumors were solitary and confined to the transverse colon or cecum. The parenchyma consisted of atypical round cells with abundant mitoses; oval or polymorphous cells were found less frequently. Necrotic areas with adjacent inflammatory infiltrates were always observed in the intestinal wall areas adjacent to the tumors. It appears, therefore, that the source of tumor was the lymphoid tissue within the necrotic areas of the intestinal wall.

65-43 CARCINOSARCOMA OF CORPUS UTERI WHICH DEVELOPED SIX YEARS AFTER THE TREATMENT BY IRRADIATION OF UTERINE CERVICAL CANCER. (Rus.) Bokhman, Ia. V. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) and S. M. Tsvei. Akush. Ginek. 40(5):155, 1964.

Treatment of a cervical carcinoma in a 53-year-old pt. with 6 applications of cobalt⁶⁰ (total 5103 mg/hr.) and X-irradiation was followed 6 yr. later by development of a carcinosarcoma which was seen upon operation because of a new abdominal mass. It was stated that the irradiation could not show stimulatory action because of the high doses used.

65-44 CHROMOSOME ABERRATIONS IN RADIATION WORKERS. (E.) Norman, A. (Dept. Radiol., U. California, Los Angeles), M. Sasaki, R. E. Ottoman and R. C. Veomett. Radiat. Res. 23(2):282-289, 1964.

Chromosome studies are reported on the leukocytes of peripheral blood of 36 radiation workers, 33 of whom have received lifetime exposure doses in excess of 10 r. The frequency of aneuploid and quasidiploid cells, dicentrics and other exchanges was significantly higher in this group than in 23 controls. The possibility of relating frequency of chromosome aberrations and risk of leukemogenesis is discussed.

65-45 TESTICULAR TUMORS IN NORMAL AND IRRADIATED RATS. (E.) Berdjis, C. C. (Walter Reed Army Med. Unit, Ft. Detrick, Maryland). Oncologia (Basel) 17(3-4):197-220, 1964.

Among 63 untreated control Sprague-Dawley rats, 7 (11%) developed interstitial Leydig cell testicular tumors (5/7 at ages 25-36 mo.). Among

156 adult test rats, given whole-body irradiation (500 r or 3 x 350 r), 39 (25%) developed testicular tumors within 12-24 mo. after irradiation; 16 of these occurred in rats younger than 2 yr. Histologically, there were 29 interstitial Leydig cell tumors (including 15 mixed tumors, generally composed of 2 or more histologic variants of benign and occasionally malignant nodules), 2 seminomas, 2 tubular adenomas, 2 embryonal carcinomas, 2 fibrosarcomas, 1 Wilm's tumor and 1 tumor of an undetermined type. The data suggest an age-dependency of tumor development. Regressive changes in old age are described. (See also CRA 2(1):#23, 1964.)

65-46 POST-IRRADIATION SARCOMAS. (E.) Rao, R. S. (Dept. Surg., Tata Mem. Hosp., Bombay, India). J. Postgrad. Med. 10(2):54-57, 1964.

Four cases are reported where sarcomas developed 6-7 yr. after therapeutic irradiations. Three fibrosarcomas developed after treatment of a squamous cell carcinoma (male, age 65); a recurrent cavernous hemangioma (girl, age 12); and Hodgkin's disease (male, age 17). A chondrosarcoma developed in a boy who had had Ewing's sarcoma. Other cases of irradiation sarcoma are reviewed from the literature (8 references), emphasizing the long latent period (3-20 yr., av. 6 yr.).

65-47 IATROGENIC LESIONS INDUCED BY RADIATION. (It.) Robinson, D. W. (U. Kansas Med. Ctr., Kansas City) and F. W. Masters. Gazz. Sanit. 35(4-5):188-189, 1964.

The authors condemn the use of irradiation in the treatment of benign lesions which can be treated otherwise or which with time are known to undergo malignant transformation. Of 166 pts. with post-irradiation lesions, 46% had been treated for

benign disorders and only 37% for malignant conditions. Benign lesions which most frequently gave rise to post-irradiation malignancies were: plantar verrucae (22%); dermatitis (17%); hemangiomas (15%); fungus infections (12%); acne (10%). Malignant degeneration was seen in 31 pts., that is 29.3% of those who had received radiation treatment for benign lesions. Spinocellular carcinomas developed most frequently on the hands (44%) and basal cell cancer on the face (42%). In 74% the malignant tumor appeared from 10 to more than 20 yr. after irradiation.

65-48 IS POLONIUM (Po210) A CARCINOGENIC FACTOR IN EXCESSIVE CONSUMPTION OF CIGARETTES? (Ger.) Lorant, M. (21 Grange Park, London, W. 5). Med. Klin. 59(27):1106-1107, 1964.

Tobacco contains small amounts of Po210, which emits α -rays. Excessive smoking (2 packs or 40 cigarettes/day) exposes the bronchial mucous membranes to a radiation dose at least 7 times higher than that due to atmospheric radiation in non-smokers. The conc. of Po210 in urine is markedly higher in smokers than in nonsmokers. The conc. of Po210 in smoke is the same for filter and non-filter cigarettes.

65-49 A CASE OF ROENTGEN-INDUCED CARCINOMA OF THE LOWER PHARYNX. (Jap.) Nagata, Y. (Nat. Matsuyama Hosp., Japan). Rinsho Hoshasen (Clin. Radiography (Tokyo)) 8(3):216-217, 1963.

A 45-year-old Oriental female, who was treated with radiation over a period of 1.5-2 yr. for lymphadenitis of the neck (no dosage given), developed 12 yr. later carcinoma of the skin at the site of radiation therapy, which was successfully treated by surgery. Ten years later, the pt. developed a squamous cell carcinoma of the lower pharynx which the author attributed to the radiation therapy received 22 yr. earlier.

See also abstract nos.: 1,5,7,22,25,135,136,196

CHEMICAL CARCINOGENESIS

65-50 IMMUNOLOGICAL STUDIES OF LEUKEMIA BY THE FLUORESCENT ANTIBODY TECHNIC. III. DISTRIBUTION OF FRACTIONATED CELLULAR ANTIGENS IN LEUKEMIC CELLS. (Jap., Abstract) Kotsuka, T. (Dept. Int. Med., Okayama U. Sch. Med., Japan), M. Kahara, Y. Takahashi and T. Makiyama. Nippon Ketsueki Gakkai Zasshi (Acta Hemat. Jap.) 26(3,4): 432, 1963.

In an immunologic study of various experimental and human leukemias, antibodies were prepared in rabbits by i.v. inj. of various cell fractions: nuclear (N), mitochondria (M), microsome (P), soluble (S) and fluorocarbon (F). Liver, spleen and lymph nodes from 2 mouse leukemias were used: methylcholanthrene-induced in the RF mouse and spontaneous in the C58 mouse. Also examined was bone marrow of human acute myeloid leukemia (AML), lymph nodes of acute lymphatic leukemia (ALL), and spleen of human anaplastic anemia. N antigen was found in the nuclear membrane and diffusely in the cytoplasm but not within the nucleus; M antigen was seen in the periphery of the nucleus; P and S antigens were seen diffusely dispersed in the cytoplasm; a few F antigens were present in the periphery of the cytoplasm. Virus-antigen of C58 leukemia appeared as minute granules in the cytoplasm and intercellular spaces. Mutual antigens were seen in each fraction of spleen, lymph nodes and bone marrow. Antigen activity paralleled the increasing severity of the leukemia. In human leukemia, anti-AML serum was reactive to neutrophils but not to the ALL cell, whereas anti-ALL serum was reactive to the ALL cell but not to neutrophilic leukocytes. It was considered that virus antigen was demonstrated in the fluorocarbon fraction, and that specific antigen for each cell type was proved except for leukemia.

65-51 EFFECT OF CARCINOGENIC NITROSAMINES AND NITROSAMIDES ON THE ADENINE-6-45-BACK-MUTATION SYSTEM OF SACCHAROMYCES CEREVISIAE. (Ger.) Marquardt, H. (Inst. Bot. Res., U. Freiburg i. Br., Germany), F.-K. Zimmermann and R. Schwaier. Zschr. Vererbungs. 95(1):82-96, 1964.

Back-mutation experiments were carried out with nitrosamides (N-nitroso=R; R-N-methylurethan (I), R-N-methylacetamide (II), R-N-methyl urea (III), R-N₁N₂-dimethyl urea (IV), R-N₁N₂N₂-trimethyl urea (V), R-N-methyl-N'-nitroguanidine (VI), R-N-methyl-p-toluenesulfonamide (VII), R-n-methyl-sulfolane (VIII), N,N'-dinitroso-N,N'-dimethyloxamide (IX), N,N'-dinitroso-N,N'-dimethylterephthalic acid amide (X)), nitrosamines (dimethyl (XI) or diethyl-nitrosamine (XII)), N-methylacetamide (XIII), N-methylnitroguanidine (XIV), 1-nitroso-imidazolidone (XV), ethyldiazoacetate (XVI), and diazoacetone (XVII) using an adenine-requiring strain of Saccharomyces cerevisiae mutated at the site 45 within the ad 6-locus. Some of these compounds are carcinogenic and probably exert their effect by producing diazomethane (D) which is

converted into an alkylating carbonium ion. D itself exerts a weaker mutagenic effect than the compounds producing it. High mutation rates could be induced in the mutant ad 6-45 with only weakly lethal conc. of nitrosamides. No mutagenic effect was found with compounds XI, XII, XVI, XVII, XVIII and XIV as well as some nitrosamides which were rather insoluble or very stable (VII, VIII, IV and V). Compounds XIII and XIV lack the nitroso group and therefore cannot produce D. The mutagenic effect of stable nitrosamides such as terephthalic acid and nitroguanidine derivatives could suggest an enzymatic degradation yielding D. The mutations observed in the mutant ad 6-45 are probably due to methylation resulting in the formation of 7-methylguanine. In carcinogenesis, the primary reaction on the molecular level probably occurs in DNA, in the case of nitrosamides at the guanine moiety rather than elsewhere. In addition to this molecular reaction, further changes in the cell regulatory system are considered to be necessary. These changes may result in alterations in the nuclear and ploidy patterns on the tissue level.

65-52 INDUCTION OF OLFACTORY NEUROEPITHELIAL TUMORS IN SYRIAN HAMSTERS BY DIETHYLNITROSAMINE. (E.) Herrold, K. M. (NCI, Bethesda). Cancer 17(1):114-121, 1964.

Following the s.c. admin. of diethylnitrosamine (DENA; 2 mg 2x/wk. for 4-6 mo.) to 20 Syrian hamsters (Mesocricetus auratus) of both sexes, 14/15 surviving animals developed tumors of the nasal cavity. The tumors were of various histological types: squamous cell papilloma, squamous cell carcinoma, adenocarcinoma and olfactory neuroepithelial tumors. The olfactory neuroepithelial tumors of the hamster, which arise from olfactory epithelium, histologically resemble the olfactory neuroblastoma, a rare malignant tumor, in man. Other tumors induced by s.c. admin. of DENA are reported in CRA 1(5):#884, 1963, while tumors induced by intragastric and intratracheal admin. of DENA are reported in CRA 1(6):1072, 1963.

65-53 IMMUNOLOGIC BEHAVIOR OF THE SPLEEN IN THE COURSE OF EXPERIMENTAL CARCINOGENESIS DUE TO DIMETHYLAMINOAZOBENZENE. (Fr.) Dufour, D. (Dept. Biochem., U. Laval Sch. Med., Quebec, Canada) and P.-M. Gagnon. Bull. Assn. Franc. Cancer 51(1):121-125, 1964.

Spleens of Sprague-Dawley rats fed a diet with dimethylaminoazobenzene (DAB) revealed the presence of a double immunologic process consisting in the increase of the antigenic activity of a natural antigen and in the appearance of a specific antigen not found in the spleen of normal rats. These antigenic changes were consistently found in the spleen of all animals (unspecified) fed a DAB-diet whose liver was macroscopically damaged, regardless

of the duration of treatment or of the stage of cancerous transformation. (See also CRA 1(2): #199, 1963; *ibid.*, 1(12):#2115; and *ibid.*, 2(3): #501, 1964.)

- 65-54 OCCURRENCE OF 20-METHYLCHOLANTHRENE-INDUCED LUNG TUMORS IN THE NEWBORN MOUSE. (Jap., Abstract) Kimura, I. (Dept. Path., Nara Coll. Med., Japan) and Y. Nishira. *Nippon Byori Gakkai Kaishi* (Trans. Soc. Path. Jap.) 52:228-229, 1963.

20-Methylcholanthrene (MC; 0.1 mg in corn oil, s.c.) was given to newborn (0-3 days) A strain and dd₁ mice and to 22-66-day-old A strain mice; adults of the same strain were given 0.2 mg. Of the A strain newborn mice, 1/12 developed adenoma and 7/12 hyperplastic foci in the lungs 4 wk. later. At 6 wk., 5/23 showed adenoma of the lungs on microscopic examination as did 3/9 examined 8 wk. after admin. of MC. Of the mice examined 14 wk. and longer after MC admin., all (23/23) showed lung tumors grossly; 9/23 had fibrosarcomas, 1/23 papilloma at the site of inj. One of the 5 dd₁ strain mice had an adenoma 8 wk. after treatment. In the adult mice, 1/6 had hyperplastic foci in the lungs after 6 wk.; after 8 wk. 1/10 had a lung tumor and 4/10 hyperplastic foci in the lungs. The control mice, given inj. of corn oil, showed no marked change. In the discussion, T. Nishizuka reported that MC (60 µg s.c.), given to Swiss mice in the first 6 hr. after birth, caused similar results with 10% of the mice showing lung tumors, s.c. sarcoma or leukemia after one year, and liver tumors in all the surviving males. The same dose of MC given 10 or 30 days after birth resulted in a lower incidence of lung tumors and in the number of tumors per animal one year later.

- 65-55 EXPERIMENTAL TERATOGENESIS. (Sw.) Sevastikoglou, J. A. (Dept. Orthoped., U. Hosp., Uppsala, Sweden). *Nord. Med.* 71(26): 791-794, 1964.

Injection of crystalline insulin (6 IU in 0.05 ml physiologic saline) into 4-day-old fertilized hen's eggs resulted in either simple micromelia or severe micromelia complicated by chondrodys-trophy and generalized skeletal abnormalities. These changes were accompanied by disturbances of alkaline and acid phosphatase activity, with both phenomena appearing for the first time on or about day 10 of incub., when the initial effects of the insulin inj. were beginning to disappear. Inj. of papain (0.05 ml 1% soln. in physiologic saline) into 3- or 6-day-old, fertilized hen's eggs failed to induce significant teratogenic effects.

- 65-56 METABOLISM OF POLYCYCLIC COMPOUNDS. 24. THE METABOLISM OF BENZ(a)ANTHRACENE. (E.) Boyland, E. (Chester Beatty Res. Inst.,

London, S.W.3) and P. Sims. *Biochem. J.* 91(3): 493-506, 1964.

Male Chester Beatty rats were given benz(a)anthracene (BA; 2 ml i.p. every other day of a 5% suspension in arachis oil for a total dose of 12 g), and BA metabolism was studied by chromatography and various oxidative and hydrolytic tests of the collected urine and feces. The major metabolic product of BA excreted was found to be the mercapturic acid N-acetyl-S-(5,6-dihydro-6-hydroxy-5-benzanthracenyl)cysteine. Other sulfuric acid and glucuronic acid conjugates included: 3-, 4-, 8- and 9-hydroxybenzanthracene and 3,4-dihydro-3,4-dihydroxy-, 5,6-dihydro-5,6-dihydroxy-, 8,9-dihydro-8,9-dihydroxy- and 10,11-dihydro-10,11-dihydroxy-benzanthracene. Not detected were 1- and 2-hydroxybenzanthracene. Comparative studies in BA-treated rabbits (10 ml i.p. of 5% BA suspension in arachis oil every 2 days for 8 days) and mice (single inj. of 0.5 ml of 10% BA suspension in arachis oil) showed no qualitative differences from the above. In rats, 7,12-dihydro-7,12-dihydroxybenzanthracene was shown to be excreted as conjugates of sulfuric and glucuronic acid and of 3-, 4- and 7-hydroxybenzanthracene; benzanthracene-7,12-quinone was not converted into any of these compounds. The bile of BA-treated rats, besides the above mercapturic acid, also contained the corresponding cysteine, cysteinylglycine and glutathione conjugates. Other metabolites observed were a second glycine conjugate related to the mercapturic acid in the urine of BA-treated rats and another glucuronic acid conjugate (unidentified) in the urine of all BA-treated animals.

- 65-57 THE EFFECT OF CUPRIC OXYACETATE ON THE BINDING OF AZO-DYE BY PROTEIN DURING THE INDUCTION OF LIVER TUMOURS IN THE RAT. (E.) Fare, G. (Dept. Path., U. Birmingham Sch. Med., England). *Biochem. J.* 91(3):473-478, 1964.

When maize + 4-dimethylaminoazobenzene (DAB; 0.09%) was fed to 3-4-month-old female albino rats, the amount of azo dye-bound liver protein rose to a max. after 100 days and then progressively decreased. In rats fed maize + DAB + cupric oxyacetate hexahydrate (COH; 0.5%) the max. amount of azo dye bound was slightly less than the above and appeared approx. 2 mo. later. With diets containing DAB, the liver copper increased by 40% after 315 days; with diets containing COH, the copper content was increased 40-fold at 330 days. For the first 200 days, most of the stored copper was bound to protein, but afterwards, further copper was held only loosely and steady saturation levels of bound copper 10 times the normal amount were maintained. The mechanism by which copper delays the induction of liver tumors by DAB is also discussed. (See also CRA 1(12):#2112 and *ibid.*, 2(4):#695, 1964.)

- 65-58 HEPATOMAS IN RATS AND HEPATORENAL INJURY IN DUCKLINGS FED PEANUT MEAL OR

ASPERGILLUS FLAVUS EXTRACT. (E.) Newberne, P. M. (Dept. Nutr. Food Sci., Massachusetts Inst. Tech., Cambridge), W. W. Carlton and G. N. Wogan. Path. Vet. 1(2):105-132, 1964.

This work is an extension of CRA 1(4):#684 and #685, 1963 with results showing a similar high incidence of hepatomas and renal damage in rats fed certain lots of peanut meal. The result of peanut meal feeding to ducklings is already reported as CRA 1(4):#686, 1963. The same lots of meal induced comparable injury in both hosts. In addition, day-old male Pekin ducklings were intubated with extracts of *Aspergillus flavus* (grown on sterilized crushed wheat) for 5 consecutive days. These chloroform extracts were highly toxic and induced both liver damage and bile duct hyperplasia, similar to that seen after peanut meal feeding. Ether extracts induced hepatic cell damage but no bile duct hyperplasia. Experiments are in progress to determine the identity of the carcinogenic factor(s) in these meals. In an addendum it is noted that fluorescence assays have confirmed the presence of aflatoxins in the peanut meals used in these investigations.

65-59 **BLADDER TUMOR INDUCTION IN RATS FED 2-ACETAMIDOFLUORENE (2-AAF) AND A PYRIDOXINE-DEFICIENT DIET.** (E.) Melicow, M. M. (Columbia-Presbyt. Med. Ctr., New York), A. C. Uson and T. D. Price. J. Urol. 91(5):520-529, 1964.

The effect of 2-acetamidofluorene (2-AAF) and pyridoxine (vitamin B₆)-deficient diet was studied in the following groups of adult female Fisher line 344 rats (age 3 mo.): Group A, diet containing 4 mg vitamin B₆ + 600 mg 2-AAF/kg of food; Group B, vitamin B₆-deficient diet (0.25 mg/kg of food) + 2-AAF for 1 mo., then vitamin B₆ without 2-AAF; Group C (2 groups), vitamin B₆-deficient diet + 600 mg 2-AAF throughout the experiment. Bladder neoplasms were seen in 2/18 rats in Group A and none among 23 rats in Group B; in both groups av. survival time was judged too short for tumors to develop (less than 5 mo. for Group A). Bladder tumors were seen in 6/20 in Group C₁ which had an av. survival time of 175 and in 11/12 in Group C₂ which had an av. survival time of 272 days. The tumors were of the urothelial type in younger animals and of the squamous cell variety in older animals.

65-60 **STUDIES OF THE ONCOGENIC RESPONSE OF NEWBORN MICE TO VARIOUS CARCINOGENIC CHEMICAL AGENTS. I. LEUKEMOGENESIS BY 9,10-DIMETHYL-1,2-BENZANTHRACENE AND 20-METHYLCHOLANTHRENE IN SWISS, C57BL AND C3Hf/Gs MICE.** (It.) Tridente, G. (Inst. Path. Anat., U. Bari, Italy), N. Pennelli, L. Mazzarella and L. Fiore-Donati. Boll. Soc. Ital. Biol. Sper. 40(11):604-607, 1964.

In newborn Swiss mice given 9,10-dimethyl-1,2-benzanthracene (DMBA; in olive oil) s.c. (0.06 mg)

or intrathoracically (IT; 0.01 mg), malignant lymphomas (ML) developed in 27/45 (60%) and 21/38 (55%), resp., as compared with 2/56 in controls. The av. latent period (LP) was 13 and 19 wk., resp. (controls, 39.5 wk.). In C3Hf/Gs newborn mice given DMBA s.c. (0.03 mg) ML developed in 45/104 (43%) with an av. LP of 16 wk. No ML were seen in controls. Local sarcomas developed in mice treated with DMBA s.c. Other tumors noted included pulmonary adenomas, hepatomas, cutaneous and gastric papillomas after both s.c. and IT admin. of DMBA. When 20-methylcholanthrene (MC) was admin. s.c. (0.1 mg) or IT (0.03 mg) to newborn Swiss mice, ML developed in 3/51 (6%) and 32/64 (48%), resp., compared to 2/56 (3.5%) in controls; the av. LP was 19 and 14 wk., resp. (in controls, 39.5 wk.). In C57BL newborn mice the same doses of MC s.c. or IT produced ML in 0/36 and 13/37 (35%), resp.; in the latter instance, the av. LP was 13 wk. (No tumors were seen in controls). In Swiss mice MC admin. induced, in addition, pulmonary tumors, hepatomas and, occasionally, hepatic angiomas and cutaneous and gastric papillomas; C57BL mice also presented pulmonary adenomas. In mice of both of these strains the admin. of MC s.c. produced sarcomas at the inoc. site. The high incidence of ML observed in mice inoc. IT with either drug was ascribed to the direct contact of the carcinogenic agent with the thymus. (See also the following abstract.)

65-61 **STUDIES OF THE ONCOGENIC RESPONSE OF NEWBORN MICE TO VARIOUS CARCINOGENIC CHEMICAL AGENTS. II. INDUCTION OF SUBCUTANEOUS SARCOMAS BY 9,10-DIMETHYL-1,2-BENZANTHRACENE AND 20-METHYLCHOLANTHRENE IN SWISS, C57BL AND C3Hf/Gs MICE.** (It.) Tridente, G. (Inst. Path. Anat., U. Bari, Italy), L. Mazzarella, N. Pennelli and L. Fiore-Donati. Boll. Soc. Ital. Biol. Sper. 40(11):607-610, 1964.

In newborn Swiss and C3Hf/Gs mice s.c. inj. of 0.06 or 0.03 mg of 9,10-dimethyl-1,2-benzanthracene (DMBA) produced sarcomas at the inoc. site in 7/45 (15.5%) and 10/104 (9.4%), resp.; the av. latent period was 19 and 17 wk., resp. In newborn Swiss and C57BL mice the s.c. admin. of 20-methylcholanthrene (MC; 0.1 mg) produced sarcomas at the site of inoc. in 27/51 (53%) and 28/36 (78%), resp.; the av. latent period was 19 and 19.5 wk., resp. These tumors were polymorphic giant cell fibrosarcomas. Sarcomas were not seen in controls nor in mice inj. with DMBA (0.01-0.03 mg) or MC (0.03 mg) intrathoracically. (See also the previous abstract.)

65-62 **THE PRACTICAL SOLUTION OF A PROBLEM OF HYGIENE IN A STEEL FACTORY. EXPOSURE OF WORKERS TO A MIST CONTAINING 3,4-BENZOPYRENE.** (Fr.) Rondia, D. (Dept. Toxicol., Fac. Med., U. Liege, Belgium). Arch. Mal. Prof. 25(7-8):403-406, 1964.

Analysis of two air samples collected at head height in the immediate vicinity of steelworkers during the nebulization of a mineral oil by compressed air on the internal surface of an ingot-mold revealed a 3,4-benzpyrene (BP) content of 126 $\mu\text{g}/\text{m}^3$ in one and 90 $\mu\text{g}/\text{m}^3$ in the other sample. Eight other heavy, polycyclic hydrocarbons (including fluoranthene, 1,2-benzanthracene, phenanthrene, 1,2-benzpyrene, pyrene and 1,12-benzoperylene) were also demonstrable in the vapor cloud, whose particles varied in size from 1-50 microns, the finer particles continuing in suspension in the air after workers had removed their masks. Although the carcinogenic activity of the oil could not be assessed with certainty, it was recommended that an oil derived from coal be replaced by one from petroleum. Nebulization by compressed air was replaced by a high pressure diffusion process.

- 65-63 CANCER OF THE SCROTUM IN WORKERS OF THE SCREW-CUTTING INDUSTRY. (A STUDY OF 21 CASES). (Fr.) Tourenc, E. R. (Bonneville Hosp., Haute-Savoie, France). Marseille Chir. 16(1):1-11, 1964.

At the Bonneville Hospital, located in a region where the screw-cutting industry is most important, cancer of the scrotum represented 8.1% (21/258) of the cancer cases observed among a total of 9,800 surgical operations performed during the yr. 1954-1963. All the pts. with cancer of the scrotum were screw cutters and, due to their profession, had been handling carcinogenic mineral oils for 9-25 yr. The cutting oils employed continually soaked their trousers and the lower half of their bodies. All, except one (who was 37), were older than 50. Cancer always developed at the site of a pruritic hyperkeratotic lesion of long standing, and was ulcerated at the time of diagnosis. The skin of these workers presented numerous, varied lesions, including comedones, acne, sebaceous cysts, and hyperkeratotic patches.

- 65-64 CANCER OF THE SCROTUM IN WORKERS OF THE SCREW-CUTTING INDUSTRY. A STUDY OF 21 CASES. (Fr.) Tourenc, E. R. (Bonneville Hosp., Haute-Savoie, France) and G. Donche-Gay. Ann. Chir. 18(9-10):610-614, 1964.

See CRA 3(1):#63, 1965.

- 65-65 CANCER OF THE SCROTUM IN WORKERS OF THE SCREW-CUTTING INDUSTRY. (A STUDY OF 21 CASES). (Fr.) Tourenc, R. (Bonneville Hosp., Haute-Savoie, France). Presse Med. 72(34):2009-2012, 1964.

See CRA 3(1):#63, 1965.

- 65-66 THE BRAIN IN EXPERIMENTAL CHRONIC DISEASES OF THE LIVER (ETHIONINE-INDUCED

CIRRHOSIS, CCl_4 -INDUCED ADENOCIRRHOSIS AND CANCRO-CIRRHOSIS, DAB-INDUCED ADENOCARCINOMA) IN RATS SURVIVING FOR LONG PERIODS FOLLOWING CESSATION OF TREATMENT. (It.) De Biase, G. (Inst. Path. Anat., U. Florence, Italy) and M. G. Bernetti. Arch. De Vecchi Anat. Pat. 40(1):133-173, 1964.

After the induction of liver disease by feeding a diet with (1) dl-ethionine at 0.3% or (2) p-dimethylaminoazobenzene for 3 mo. or by (3) CCl_4 inhalation over a period of 7 mo., male and female albino rats (wt. 210-320 g) were observed for a further period of 1-3, 3-6, and 5-10 mo., resp. At spontaneous death or sacrifice, histological examination of the brain revealed the following changes: edema and hyperemia, especially of the white matter in the cerebral hemispheres; acute swelling and hyperplasia of the oligodendroglia cells; reactive changes of microglia; degeneration of astroglia in the gray matter of the basal ganglia and cortex with the appearance of elements resembling the "naked pale nuclei"; absence of astrocyte hyperplasia; regressive changes of the nerve cell accompanied by satellitosis and, less frequently, by neuronophagia; and absence of copper accumulation. These findings were related to the time of survival after cessation of treatment rather than to the type of treatment. Regressive alterations of the acute type, edema and hyperemia predominated in rats sacrificed immediately after the end of treatment. Microglial reaction and elements of the "naked pale nuclei" type appeared to increase with the prolongation of survival; gliar modifications reached the greatest intensity and frequency in those rats which survived the longest. These results confirm the existence of a genetic relationship between liver and brain lesions.

- 65-67 BEHAVIOR AND DEVELOPMENT OF THE "OVAL CELLS" AFTER HEPATECTOMY IN THE LIVER OF RATS TREATED WITH DAB. (It.) Bartoloni Saint Omer, F. (Inst. Path. Anat., U. Florence, Italy). Arch. De Vecchi Anat. Pat. 40(1):109-132, 1964.

In albino Wistar female rats (wt. 180-210 g) fed a diet of polished rice with the addition of p-dimethylaminoazobenzene (DAB; 1.5 g/kg, in olive oil) for 40 days, the liver presented a progressive reduction of the laminar parenchyma accompanied by a rapid proliferation of "oval cells" and sometimes by the formation of biliary pseudotubules with invasion of the intrahepatic veins. When these rats were subjected to hepatectomy on day 40 of DAB feeding, the percentage of hepatic regeneration 72 hr. later was 57.52 as compared with 69.85 in controls. Histologically, the marked reduction or disappearance (in some cases) of the oval cells, the rare presence of biliary ductules with concomitant appearance within the framework of oval cells of a solid block of liver cells, the structure of which was intermediate between that of oval cells and normal hepatocytes, indicated that this marked liver regeneration had taken place mostly at the expense of the oval cells.

The latter should, therefore, be considered as undifferentiated reserve elements, which appear subsequently in various pathologic conditions and may differentiate toward the formation of either an excretory (biliary duct) or secretory epithelium (liver cell parenchyma).

65-68 DISORDERS IN THE DIFFERENTIATION OF PROTEIN SECRETION IN NEOPLASTIC PLASMA CELLS. (E.) Potter, M. (NCI, Bethesda) and E. L. Kuff. J. Molec. Biol. 9(2):537-544, 1964.

The following plasma-cell neoplasms were induced and transplanted in BALB/c female mice: Adj PC-6 induced by Lieberman's adjuvants; MOPC-31 induced by mineral oil; MOPC-47 induced by Freund's adjuvants (FA) + ovalbumin (OV); MOPC-70 induced by FA + OV. Each of the neoplasms yielded two different protein-producing lines, and the structural relationship between the serum and urinary proteins produced by related lines was investigated by immunoelectrophoretic and tryptic peptide map techniques. In each instance, different proteins elaborated by lines originating from the same host were found to contain the same L chain structural unit. Differences between cell lines were found to be related to the chain composition of the produced proteins and to the coordination of α and H chain synthesis in the cells. (See also RA 1(6):#1045, 1963.)

65-69 AN ELECTRON MICROSCOPE STUDY OF MOUSE SKIN DURING 20-METHYLCHOLANTHRENE-INDUCED CARCINOGENESIS. (Jap.) Ozaki, T. (Dept. Otorhinolaryng., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(2):115-133, 1963.

Swiss albino mice (wt. 30 g; age 3+ mo.) received topical applications of 0.5 ml of 0.3% 20-methylcholanthrene in benzene on the skin twice weekly. During a period of 14 wk., gross observation revealed skin tumors in 65/82 mice. During the period from wk. 17 to wk. 29, squamous cell carcinomas were histologically verified in 33/50 and spindle cell sarcomas of the skin in 3 other mice. No tumor developed in mice receiving benzene alone. In a light and electron microscope study, the process of skin tumor formation was divided into four stages: 1. initial response (day 1-3); 2. diffuse cellular proliferation (day 5 to wk. 11); 3. the production of papilloma (wk. 12-16); 4. the final malignant stage (after wk. 17). In the first stage, the enlargement of intercellular spaces and appearance of swollen and condensed cells in the basal and prickly cell layers were observed. In the 2nd stage, the differentiation and derangement in each layer, caused by differentiation of cytoplasmic structures (especially tonofilaments), shift of cells to the upper layers, and disturbed keratinization, were noted. The crown of thorn-like pattern in the cytoplasm was observed at later stages. The swelling and enlargement of mitochondria containing intra-mitochondrial granules

were observed mainly in prickly cells after day 3. Marked reticulation of cells was noted in papilloma and carcinoma in stages 3 and 4. In carcinoma, besides marked derangement and reticulation, an increase of the nucleus:cytoplasm ratio, variation in nuclear size, irregularity of nuclear contour, increase in volume and number of nucleoli, and the appearance of clear and dark cells were noted.

65-70 STUDIES ON THE CHANGE OF 20-METHYLCHOLANTHRENE, ONE OF CARCINOGENIC HYDROCARBONS IN THE BODY. 2. STUDIES ON URINARY EXCRETION OF 20-METHYLCHOLANTHRENE ADMINISTERED IN VIVO. (Jap.) Sasaki, K. (Dept. Biochem., Tokushima U. Sch. Med., Japan). Shikoku Igaku Zasshi (Shikoku Acta Med.) 19(5):323-329, 1963.

Chromatographic study of urine after i.v. inj. of 20-methylcholanthrene (MC; 10-50 mg) into normal rabbits revealed some unchanged compound. MC excretion increased with the dose admin. Daily excretion of MC increased for 1-2 days, decreased during the wk. following, then increased gradually reaching a peak 3 wk. after admin.; small amounts of MC were still excreted after 3-4 wk. up to 83-114 days after admin. At 5 hr. after admin., total MC excreted was approx. 0.2% the admin. dose; at 4 wk. this rose to 10.5%. One of the 3 rabbits tested died 70 days after admin. Histopathological study of this rabbit revealed accumulation of fatty tissue around the kidneys as well as almost complete fatty degeneration in the liver.

65-71 COULD CARCINOGENIC SUBSTANCES FROM PARAFFIN-IMPREGNATED PACKING MATERIAL INFILTRATE THE PACKED FOOD? (Ger.) Heiss, R. (Inst. Food Tech. Packing, Munich, Germany). Munchen. Med. Wschr. 106(33):1444, 1964.

The author feels that the possibility of penetration into food of carcinogenic substances from paraffin packing material can be denied without reservation. The paraffins used for this purpose are checked for purity before approval by a federal board of health. Fluorescence studies are performed and the content of polycyclic aromatic substances (3,4-benzpyrene; 1,2,5,6-dibenzanthracene; 20-methylcholanthrene) is determined for the paraffins (total content should not exceed 0.01 ppm).

65-72 INDUCTION OF MAMMARY TUMORS IN THE FEMALE HAMSTER BY MEANS OF CUTANEOUS PAINTINGS OR FEEDING WITH URETHAN. (Fr.) Rivière, M. R. (Lab. Exp. Med., Inst. Sci. Cancer Res., Villejuif, Seine, France), M. T. Perrier, I. Chouroulinkov and M. Guérin. C. R. Soc. Biol. (Paris) 158(3):440-443, 1964.

In female golden hamsters (Mesocricetus auratus), age 1 mo., whose dorsal region was painted twice a wk. with urethan (U; 50% in acetone, 125 mg/painting) or who received U in their drinking water

(approx. 15 mg/day), mammary tumors developed in 12-18 mo. in 4/20 painted animals and in 2/20 receiving U p.o.; no tumors developed in 40 untreated controls. Histologically, the tumors were papillary epitheliomas; multiple pulmonary metastases were found in 5 animals. Three tumors were transplanted and grew similarly in either sex; the grafts either maintained the characteristics of the original tumor or presented sarcomatoid aspects. Mention is made that melanotic tumors appeared in some of these hamsters long before the mammary epitheliomas were seen. The role of U in mammary carcinogenesis remains obscure.

- 65-73 THE LINEAR AND AGE REACTION SPECIFICITY OF MICE TO URETHAN INJECTIONS. (Rus.) Egorov, I. K. (N. F. Gamaleya Inst. Epidemiol. Microbiol., Acad. Med. Sci. USSR, Moscow). Vop. Onkol. 10(7):75-78, 1964.

Urethan (U; 0.01 ml of 10% soln./g i.p.; = 1 mg U) was admin. to 4 different groups of mice in this study of tumor induction. Pregnant C57BL/10SN mice received a total of 90-100 mg U in 3 inj. with weekly intervals, and pulmonary adenoma (PA) was seen in 1/12 offspring at 15 mo. Upon admin. of U (av. 14 mg x 3) to both sexes of the same strain at birth or at 1 and 2 wk., leukemia (L) developed in 8/11 mice at 3-6 mo. and PA developed in 3/11 mice at 4-14 mo. A total of 72-91 mg U to males of the same strain at age 3-7 wk. produced L in 3/20 (at 8-15 mo.), PA in 19/20 (at 8-15 mo.), hepatoma (H) in 1/20 (at 14 mo.), adenoma of Harder's glands in 18/20, submaxillary tumor in 1/20 and hepatic vascular disturbances (HV) in 10/20 (14-15 mo.); controls showed L in 1/10 at 19 mo. and HV in 1/10 at 23 mo. Males of this group were negative for polyoma virus antibodies. Admin. of a total of 76-100 mg U to males of C3H/Sn at age 3-7 wk. resulted in mesenteric tumor in 1/13, PA in 13/13 and H in 12/13 (the last 2 at 14 mo.); controls showed 5/14 H at 21-28 mo. and 1/4 sarcoma of the leg.

- 65-74 LATE APPEARANCE OF TUMORS IN RATS AFTER THE ADMINISTRATION OF 9,10-DIMETHYL-1,2-BENZANTHRACENE INTO THE LUNGS. (Rus.) Pylev, L. N. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow). Vop. Onkol. 10(8):53-60, 1964.

A total of 151 Wistar and random-bred rats were treated by intratracheal intubation of a colloidal infusion of 9,10-dimethyl-1,2-benzanthracene (DMBA; 2.5 mg in a single dose and in 3 or 5 monthly doses of 2 mg each); 108 of these also received cortisone (5 mg x 2/wk. s.c.) within 8-10 wk. after the beginning of the experiment. Period of observation was 15.5-22.5 mo. After a total optimum dose of DMBA of 6 mg, 33.3% of the animals developed tumors; 24.24% developed tumors after 10 mg. After pulmonary neoplasms, the most frequently occurring tumors were mammary fibroadenoma, adenocarcinoma and keratotic

squamous cell cancer (KSCC) of the parotid gland. KSCC of the forestomach was seen in 1 rat following 6 mg DMBA. Other tumors included: hypernephroid carcinoma of the kidney (1); polymorpho- and spinocellular sarcoma of the extremities, intestines and thoracic wall with metastases (4); KSCC of the mouth (1); hemangioendothelioma of the anterior mediastinum (1); peritracheal sarcoma (2). There was one mammary tumor in 26 controls. (See also CRA 1(7):#1271, 1963.)

- 65-75 HISTOCHEMICAL STUDY OF BRAIN PROTEINS IN MICE DURING THE PROCESS OF EXPERIMENTAL CARCINOGENESIS. (Rus.) Savich, K. V. (N. N. Burdenko Inst. Neurosurg., Acad. Med. Sci. USSR, Moscow) and S. M. Degtiareva. Vop. Neirokhir. 28(4):31-35, 1964.

Following trocar admin. of DMBA pellets (dose not stated) into the brain of black C57 mice (8-12 g), an initial (day 4) increase of RNA in the cytoplasm and nuclei of glial cells was seen, while the amount of proteins in the nuclei and cytoplasm of nerve cells decreased more markedly in treated animals than in controls. DMBA suppressed the formation of the reactive connective tissue around the traumatic focus, as compared to paraffin-implanted controls. Simultaneously there was a decrease of WBC and an increase of polyblasts in the wound area.

- 65-76 ARSENIC INDUCED CARCINOMA OF THE SKIN AND LUNG. (E.) Hill, G. C. (VA Hosp., Dearborn, Mich.). Penn. Med. J. 67(9):35-38, 1964.

The case is reported of a 47-year-old male treated approx. 20 yr. previously with 3 series of oral Fowler's soln. (no other details) for urticarial erythema multiforme and subsequently developing the typical arsenical dermatoses, intra-epithelial neoplastic changes (Bowen's disease), cutaneous basal cell carcinoma and squamous carcinoma involving the index finger, palm, and plantar surfaces, and squamous carcinoma of the lung.

- 65-77 THE EFFECT OF PROLONGED ADMINISTRATION OF ESTROGENIC PREPARATIONS ON THE DEVELOPMENT OF UTERINE CANCER. (Rus.) Tsurul'nikov, M. S. (Dept. Path., N. V. Sklifosovski Inst., Acad. Med. Sci. USSR, Moscow), N. K. Permiakov and G. V. Voronkin. Sovet. Med. 27(3):82-84, 1964.

Based on personal observation of a 32-year-old female undergoing surgery for a rapidly growing fibromyoma of the uterus, the authors believe that an adenocarcinoma of the uterine wall, diagnosed at biopsy, was induced by prolonged and uncontrolled admin. of progesterone, folliculin, synestrol and diethylstilbestrol in the treatment of menorrhagia. Ovarian histologic examination confirmed that the pt. suffered from hemorrhagic metropathy (Schroeder type) characterized by hyperfolliculinemia.

65-78 FINE STRUCTURE OF HEPATOMAS INDUCED IN RATS WITH p-DIMETHYLAMINOAZOBENZENE. (E.) Svoboda, D. J. (Dept. Path., U. Kansas Med. Ctr., Kansas City). *J. Nat. Cancer Inst.* 33(2): 315-339, 1964.

Electron microscope studies of the cells of malignant hepatomas induced in Sprague-Dawley rats by p-dimethylaminoazobenzene (DAB) revealed many cytoplasmic and nuclear deviations. In addition to a decrease in number and marked deformity of their profiles, the mitochondria showed large, dense, matrix granules with loss of and tubular transformation of cristae and vacuolization of matrix. No correlation was possible between endoplasmic reticulum structure and degree of malignancy. Tumor cells showed disordered protein synthesis, possibly related to the marked dispersion of ribosomes throughout their cytoplasm. Annulate lamellae and cytoplasmic bodies, the latter containing altered organelles and rich in acid phosphatase, were common in DAB-induced hepatomas. The cytoplasm of many tumor cells contained prominent loose and compact aggregates of fibrils, probably representing early subcellular metaplasia. The nuclei showed frequently present and enlarged pars amorpha, interchromatinic granules and nuclear pores. Adenocarcinomas were composed of cells resembling biliary epithelial cells; the acini were bound by a basement membrane. No uniform ultrastructural differences were found between primary and metastatic tumors.

5-79 PARTICIPATION OF THE SOMATOTROPIC HORMONE IN THE APPEARANCE OF UTERINE FIBROMA. (Rum.) Dănilă-Muster, A., L. Simionescu and N. Antonescu. *Stud. Cercet. Endocr.* 14(3): 89-393, 1963.

Immunological determination of serum growth hormone levels (Boyden technic) by inhibiting hemagglutination of tanned RBC was performed in 8 women with uterine fibroma. The results indicated that inhibition of hemagglutination occurred at high serum dilutions and were similar to those obtained in pts. with acromegaly. The method used demonstrates the presence in the blood of an immunologically active protein with somatotrophic activity but does not reveal any inactive fractions affecting growth. The results suggest that the pituitary (through the somatotrophic hormone) influences the appearance of uterine fibroma.

5-80 CARCINOGENIC PROPERTIES OF BENZIDINE. (Rus.) Pliss, G. B. (Inst. Oncol., Acad. Med. Sci., Leningrad). *Vop. Onkol.* 10(5): 10-55, 1964.

Male and female rats (100-120 g) received benzin (B; s.c. in oil, 15 mg/wk. x 14; one wk. later, 10 mg/wk. x 6; then once every 2 wk. x 3; total 300 mg in 6 mo.). First tumors appeared 5 mo. after treatment when only 5 females and 5 males (out of 25 each) remained alive. Liver

cirrhosis, later changing to hepatoma, developed in 2; other tumors included cancer of the sebaceous parotid gland in 5, sarcoma in 8 (6 at the inj. site and elsewhere in 2) and myeloid leukemia in one. In one of the 2 distant sarcomas (polymorphocellular) hepatoma was also found; both metastasized to the lungs. Only 4 males (and no females) survived more than 12 mo. It was therefore shown that B is a potent carcinogen, females being more susceptible to its effect than males.

65-81 EFFECT OF ZINC ON CANCEROGENESIS BY CADMIUM. (E.) Gunn, S. A. (U. Miami Sch. Med., Fla.), T. C. Gould and W. A. D. Anderson. *Proc. Soc. Exp. Biol. Med.* 115(3): 653-657, 1964.

Four-month-old male Wistar rats received a single inj. of cadmium chloride (Cd; s.c. 0.03 mmole/kg = 1.35 mg cadmium ion) and 10 mo. later the incidence of interscapular s.c. tumors (pleomorphic sarcomas) at the inj. site was 9/22 (41%). In another group receiving Cd + zinc acetate (Zn; 3 mmole/kg admin. s.c. in 3 divided doses 6 hr. prior to, simultaneous with and 19 hr. after Cd inj. in 10/17 and 4.5 hr. after in 7/17), only 2/17 (12%) rats showed s.c. pleomorphic sarcomas at the inj. site, indicating an inhibitory effect of Zn. The doses of Zn used did not alter the general physical appearance, body wt. or breeding capacity. As a possible explanation of the mechanism of anticarcinogenic action of Zn, it is postulated that Cd may improve the growth regulating mechanism of cells by deleting an essential Zn complex; this effect is prevented or retarded by the admin. of excessive Zn. (For effect on the testes, see CRA 1(12):#2088, 1964.)

65-82 MORPHOLOGICAL CHANGES IN LYMPHOID ORGANS DURING THE INDUCTION OF SARCOMAS. (Rus.) Lebedeva, L. N. (Inst. Normal Path. Physiol., Acad. Med. Sci. USSR, Moscow). *Vop. Onkol.* 10(5): 73-78, 1964.

White rats were treated with 9,10-dimethyl-1,2-benzanthracene (DMBA; 1 mg in peach oil s.c.) and sacrificed 1-260 days after treatment. Shortly after inj. an increase in the wt. of regional lymph nodes (LN) was seen as compared to controls. A decrease in thymus wt. and no change or slight increase in spleen wt. was seen in both treated rats and controls. At days 60-90 a proliferation of fibroblasts (F), some of which were atypical, was observed at the inj. site; infiltration of LN sinuses by plasma cells and simultaneous hyperplasia of lymphoid cells were also noted. First evidence of tumor growth at the inj. site was observed at days 120-180; at this time a further increase in plasma cell numbers and fibroblast atypia was seen in the LN as well as evidence of inflammation of the sinuses. The first recognizable tumors (polymorphocellular sarcomas in various stages of maturation) were seen in animals sacrificed at days 150-296. Lymphoid infiltration with

scattered foci of plasma cell masses surrounded the tumor in most cases. In rats that did not develop tumors, proliferation only appeared at the inj. site at a later date along with a pre-dominant lymphoid hyperplasia of the LN. Splenic and thymic changes were seen mostly in animals which developed tumor nodes. RNA-positive reaction was observed in plasma cells and in the cytoplasm of immature cells; RNA was present in the cytoplasm and nucleoli of tumor cells. It is concluded that plasma cell rearrangement in LN is an index of immunologic changes in the body during experimental carcinogenesis.

- 65-83 THE EFFECT OF 7,12-DIMETHYLBENZ(α)ANTHRACENE ON THE CULTURES OF NORMAL AND MALIGNANT CONNECTIVE TISSUE. (Rus.) Starikova, V. B. (Inst. Exp. Clin. Oncol. Acad. Med. Sci. USSR, Moscow). *Vop. Onkol.* 10(5):55-60, 1964.

9,10-Dimethyl-1,2-benzanthracene (DMBA) added to medium 199 and 20% bovine serum in conc. up to 0.25 mg/ml for 7 days *in vitro* inhibited the growth and especially the mitotic activity of normal rat embryonic s.c. connective tissue, embryonic heart tissue and granulation tissue that formed around cellophane strips implanted s.c. into adult rats. Tumor tissues (spinocellular sarcomas induced by s.c. paraffin implants containing DMBA; DMBA-induced sarcoma 45; sarcomas (spinocellular, polymorphocellular, fibrosarcomas) induced by s.c. cellophane implants) proved to be resistant to DMBA. Only at the highest conc. was an inconstant decrease of mitotic activity and zones of growth seen as compared to controls. DMBA did not change the duration of mitosis in normal tissue cultures and did not cause a shift in the distribution of mitotic phases. The results obtained agree with the supposition that new cells resistant to the growth inhibiting effect of carcinogens are accumulated during the process of carcinogenesis. (See also CRA 1(8): #1490, 1963.)

- 65-84 THE DISTRIBUTION AND ELIMINATION OF LABELED 7,12-DIMETHYLBENZ(α)ANTHRACENE FROM RAT TISSUES AND ORGANS. (Rus.) Lo, S.-M. (Lab. Endocr. Hormonother., Ukrainian Inst. Radiol. Oncol., Kiev, USSR). *Vop. Onkol.* 10(4): 41-47, 1964.

Admin. to female rats (age 4 mo., 180-185 g) of C14-labeled 9,10-dimethyl-1,2-benzanthracene (DMBA; 2-3 mg x 1-3 i.v.) was followed by rapid partial excretion in bile, feces, urine and milk. In ovaries, adrenals, liver, kidneys and spleen relatively high radioactivity was noted one hr. after admin., which gradually diminished thereafter. Single and triple admin. did not lead to cumulative conc. of the labeled agent in mammary glands, nor did ovariectomy or pregnancy have any effect on its distribution in tissues and organs.

- 65-85 INDUCTION OF LIVER TUMORS IN THE SYRIAN GOLDEN HAMSTER BY FEEDING DIMETHYLNITROSAMINE. (E.) Tomatis, L. (Inst. Med. Res., Chicago Sch. Med., Ill.), P. N. Magee and P. Shubik. *J. Nat. Cancer Inst.* 33(2):341-345, 1964.

Dimethylnitrosamine (DMN) admin. as a single intra-gastric dose to 8-9-week-old Syrian golden hamsters (both sexes) gave the following results: doses of 6.4 or 3.2 mg caused death 24-48 hr. and 2-4 days, resp., from the time of admin. with all internal organs showing severe congestion; doses of 1.6 mg produced 3 cholangiomas, 1 adenoma of the adrenal cortex and 1 liver cell carcinoma in animals surviving more than 63 wk.; doses of 0.8 mg produced 1 cholangioma, 1 adenoma of the adrenal cortex and 1 liver cell carcinoma in animals surviving more than 63 wk. The chronic admin. of DMN (0.0025% soln. added to drinking water; total 19 mg in 27 males and 15 mg in 31 females) resulted in a high incidence of both cholangiocarcinomas (90% males, 77% females) and liver cell carcinomas (50% both sexes) in those that survived until appearance of the first tumor. Two hemangioendotheliomas of the liver and 1 renal adenoma were also observed; no tracheal or lung tumors were seen.

- 65-86 AN EVALUATION OF A SHORT-TERM BIOLOGICAL TEST FOR CARCINOGENICITY. (E.) Peacock, P. M. *Acta Un. Int. Cancr.* 19:589-590, 1963.

See CRA 1(3):#414, 1963.

- 65-87 EXPERIMENTAL CARCINOMA OF THE CERVIX. HORMONAL INFLUENCES. (E.) Alvizouri, M. (Civil Hosp., Morelia, Michoacan, Mexico) and V. Ramirez de Pita. *Am. J. Obstet. Gynec.* 89(7): 940-945, 1964.

A comparative study is reported of 4 groups of virgin doe rabbits weighing 1.5-3.0 kg at the start of the experiment. Group I received a vaginal string impregnated with beeswax and contacting only the surface of the vaginal and endocervical mucosa. In Groups II-IV, the string was impregnated with 3 parts beeswax to 1 part 20-methylcholanthrene. Further treatment consisted of none (Group II); 2 mg/inj. β -estradiol in oil, 2 inj./wk., beginning 1 wk. post surgery (Group III); or 10 mg/inj. progesterone in oil, 2 inj./wk., beginning 2 wk. post surgery (Group IV). Surviving at 14 mo. were 12/30 in Group I, 23/27 in Group II, 20/48 in Group III, 20/34 in Group IV. No malignancies or vaginal or endocervical epithelial hyperplasia were seen in Group I survivors, although 5/23 in Group II (21%) had non-metastasizing tumors (2 prickle-cell carcinomas (PCC); 3 adenocarcinomas of the endothelial mucosa) and almost all animals surviving more than 6 mo. had focal hyperplasia of areas of vaginal mucosa which were directly in contact with the string. In

Group III, 5/27 (18.5%) surviving more than 6 mo. had malignancies (1 adenocarcinoma, 4 PCC) seen at death or sacrifice at 9-20 mo.; focal hyperplasia was a common finding. In Group IV, 4/31 surviving more than 6 mo. developed PCC; 4/4 showed focal hyperplasia of the vaginal mucosa as above. The authors comment that the differences in the rate of tumor incidence (Groups II-V) were not statistically significant.

55-88 OCCURRENCE OF MAMMARY TUMORS IN CASTRATED AGENT-FREE MALE MICE AFTER LIMITED REPEATED EXPOSURE TO DIETHYLSTILBESTROL. (E.) Erdervont, H. B. (NCI, Bethesda) and T. B. Dunn. Nat. Cancer Inst. 33(1):143-147, 1964.

Female and orchietomized (BALB/c x C3H)F1 hybrid 4.5-month-old male mice received s.c. only a 20% diethylstilbestrol pellet in the interscapular region which was removed 16 wk. later (Group II) or were also given a second pellet in the right axillary region 26 wk. later (Group I). The incidence of mammary tumors in the orchietomized males was 2% (1/59) for Group II and 55% (33/60) for Group I as compared to 41% (23/56) and 58% (34/59), resp., for the females. When female and orchietomized males were given a pellet at the age of 11-12 mo. (Group III), mammary tumor incidence was 32% (18/57) and 25% (15/60), resp. Animals that received a pellet at 2.5 mo. of age (Group IV) showed a 72% (43/60) and 75% (45/60) mammary tumor incidence in the females and orchietomized males, resp. Type A and Type B adenocarcinoma occurred most frequently, while Type C appeared only in older female mice as did a few adenoacanthomas.

55-89 12-PYRIDYLBENZ(a)ANTHRACENES. (E.) Vingiello, F. A. (Dept. Chem., Virginia Polytech. Inst., Blacksburg) and T. J. Delia. Org. Chem. 29(8):2080-2083, 1964.

In view of the known carcinogenicity of polynuclear aromatic compounds containing ring nitro-
gen, five new ketones and one ketimine were synthesized and the ring closed to their corresponding 12-pyridyl-benz(a)anthracenes. The cyclodehydrogenation of these new structures was also studied.

55-90 THE RELATIONSHIP OF BREAST DISEASE TO GYNECOLOGIC DISEASE. (E.) Swerdlow, M. (Dept. Surg., U. Illinois Coll. Med., Chicago) and L. J. Humphrey. Cancer 17(9):1165-1169, 1964.

484 pts. who had only a hysterectomy, 2 subsequently developed mammary carcinoma over an av. 12 yr. for a rate of 0.34/1000 pts./risk yr., while 3/221 pts. who underwent a hysterectomy + lateral salpingo-oophorectomy (oox.) developed mammary cancer for a rate of 1.15/1000 pts./risk yr.; this was not statistically significant. When the records of 369 cases of mammary carcinoma and 1 cases of fibrocystic disease of the breast

were reviewed, 20% of both groups had a history of previous gynecological operation. The length of time between the gynecological operation and the development of mammary carcinoma in 8 pts. (7/8 were premenopausal; av. age 48 yr.) varied from 3-16 yr. in 7/8 who died of carcinoma within 5 yr.; the 1 survivor developed breast carcinoma within 1 yr.

65-91 THE INDUCTION OF MAMMARY CANCER IN MALE MICE BY ISOLOGOUS PITUITARY IMPLANTS. (E.) Hagen, E. O. (Dept. Anat., U. Alberta, Edmonton, Canada) and H. E. Rawlinson. Cancer Res. 24(1):59-60, 1964.

When hybrid (C3H/A) 3-month-old male mice were given s.c. over the hip 3 isologous pituitary implants from male or female mice, 8/26 (31%) with the male implants and 5/21 (24%) with the female implants developed mammary tumors between 9-26 (av. 16 mo.) and 12-25 (av. 19 mo.) mo. of age, resp.; mammary tumors developed in a total of 28% of the animals. Microscopically, all except 1 of the mammary tumors, which was thought to be a fibrosarcoma, were adenocarcinomas of Type B classification; this histology was comparable to that found in corresponding tumors in the female.

65-92 EFFECTS OF BCG INFECTION OF THE TUMORIGENIC ACTION OF INH AND THE COMBINATION OF URETHAN AND 4-NQO. (Jap., Abstract) Matsuda, M. (Geriatric Ctr., Osaka, Japan) and S. Hattori. Kekkaku (Abstr. Current Lit. Tubercul.) 38(3):127-128, 1963.

Female mice (ddo Swiss albino) treated intermittently over a period of 12 wk. with INH (2 mg/day, separate periods of 14, 7 and 9 days; i.p.) developed lung tumors or induration in the lung in 14/24 animals (no details) after 9 mo. In a parallel group intermittent i.v. inj. of BCG vaccine (0.1 mg 3 and 1 wk. before, 0.2 mg 7 wk. after and 0.1 mg 22 wk. after, with reference to start of treatment with INH) reduced incidence to 5/17. Lung tumor or lung induration incidence in mice which received intermittent BCG only was 7/22; incidence in controls was 4/20. Urethan (10 mg x 1/wk. for 11 wk. i.p.), followed by s.c. inj. with 4-NQO (0.5 mg after 0, 2, 6 and 10 wk. after the final inj. of urethan), induced lung tumor in 17/20 after 7 mo. A single inj. of BCG vaccine (0.2 mg i.v.) 110 days after initiation of urethan failed to reduce the incidence of lung tumor (16/24).

65-93 CANCER FROM THE POINT OF VIEW OF PHYSICO-CHEMICAL LAWS. (Ger.) Altersauge, W. Selbst-Verlag, Dortmund, Germany, 1963, 104 pp. 16 DM. Reviewed in Zbl. Gynaek. 86(44):1574-1575, 1964.

A monograph presenting the author's ideas on the cause of cancer in relation to physicochemical

laws. After a discussion of the normal processes of metabolism, especially the maintenance of nutrition of the body cells, reactions of overcompensation and of resorption are described. The derangement of normal metabolic processes is thought to lead to the development of cancer cells in the following manner: fragments arising from cells attacked by carcinogenic agents act as allergens and elicit a copious formation of antibodies which react with partially destroyed, but still viable, body cells which may then develop an altered metabolism and become tumor cells. Finally, there is discussed the possibility of influencing metabolic processes in order to minimize tumor growth, as, for example, by increasing the pt.'s vitality, i.e., tumor growth could be delayed or a remission could be obtained by an increase of the resorptive effect originating in the normal host cells.

- 65-94 AN ELECTRON AND FLUORESCENCE MICROSCOPE STUDY OF THE DEVELOPMENT OF A MELANOTIC TUMOR INDUCED BY 7,12-DIMETHYLBENZ(a)ANTHRACENE IN THE SYRIAN GOLDEN HAMSTER. (E., Ph. D. Thesis, Order No. 64-7987, Univ. Microfilms, Inc., Ann Arbor, Mich.) Bassel, A. I. R. (U. Texas, Houston). *Diss. Abstr.* 25(1):703, 1964.

Early changes in the fine structure of hamster skin induced by cutaneous application of 9,10-dimethyl-1,2-benzanthracene (DMBA) included the appearance of large intercellular spaces in the basal layer of the epidermis, swelling of the mitochondria of both epidermal and dermal cells, an apparent decrease in the number of ribosomes per unit area in some epidermal cells, and the appearance of ribosome-containing inclusions in the cisternae and vesicles of the endoplasmic reticulum in some epidermal and dermal cells. By the use of fluorescent microscopy, DMBA was located in the keratinized layer of the epidermis, the sebaceous glands, and the hairs and hair follicles 2 hr. after application of the carcinogen. The appearance of perifollicular aggregates of melanocytes in preneoplastic melanotic lesions is described. A description of the fine structure of DMBA-induced melanotic tumors and melanin granule development in the tumors is given. The possibility of an interference in protein synthesis by DMBA is discussed.

- 65-95 A RELATIONSHIP BETWEEN OVARIAN NOREPINEPHRINE AND BREAST CANCER IN HUMANS. (E.) Anton, A. H. (Dept. Psychiat., U. Florida Coll. Med., Gainesville), H. Prystowsky and E. R. Woodward. *Proc. Soc. Exp. Biol. Med.* 114:145-147, 1963.

A markedly significant elevation of ovarian norepinephrine (NE) was found in 12/38 breast cancer pts.; these pts. had a NE content of 0.50 µg/g of tissue or more, whereas 90% of the other pts. had less than this amount. Other values of NE were 0.050-0.820 in 6/38 with carcinoma of the

cervix; 0.014 in 1/38 with ovarian thecoma; 0.240 and 0.005, resp., in 2/38 with adenocarcinoma of the endometrium. Whether these high levels of NE reflect an aberrant ovarian activity which may be a factor in the hormonal involvement of ovaries in breast cancer remains to be seen.

- 65-96 CHROMIUM, LEAD, CADMIUM, NICKEL AND TITANIUM IN MICE: EFFECT ON MORTALITY, TUMORS AND TISSUE LEVELS. (E.) Schroeder, H. A. (Dept. Physiol., Dartmouth Sch. Med., Hanover, N. H.), J. J. Balassa and W. H. Vinton, Jr. *J. Nutr.* 83(3):239-250, 1964.

A lifetime diet including 5 ppm of cadmium, lead, chromium, nickel, or titanium, administered in drinking water to about 700 mice, produced tissue accumulations of these trace metals comparable to those in man. Longevity of males was decreased by cadmium and titanium, of females by lead. All the metals produced evidence of toxicity; but at the oral doses used, no metal was carcinogenic for mice. Nickel appeared to decrease the incidence of tumors in females, and cadmium and lead decreased significantly the incidence of tumors in males.

- 65-97 NITRATION AND ACETYLATION OF 9-ALKYL-FLUORENES. (E.) Klemm, L. H. (Dept. Chem., U. Oregon, Eugene), E. Huber and C. E. Klopfenstein. *J. Org. Chem.* 29(7):1960-1964, 1964.

Syntheses and structural determinations of primary substitution products of 9-alkylfluorenes, obtained by nitration and acetylation processes, are presented.

- 65-98 COMPARATIVE STUDY OF CARCINOGENESIS IN SQUAMOUS AND COLUMNAR EPITHELIUM OF MOUSE UTERUS BY STRING METHOD OF PRODUCING CERVICAL CARCINOMA. (E.) Iijima, H. (Dept. Obstet. Gynec., Osaka U. Sch. Med., Japan), K. Nasu and I. Taki. *Am. J. Obstet. Gynec.* 89(7):946-956, 1964.

Using an improved string method of application, 20-methylcholanthrene (1 part to 3 parts of beeswax) was applied evenly and constantly to the squamous and columnar epithelium of the cervical canal in 240 normal adult virgin NA2 mice (age 12 wk.). Within 5-9 wk., 66 invasive squamous cell carcinomas developed in 53 mice; 42 of these tumors were accompanied by one or both of two kinds of atypical proliferations (which are described). The tumors occurred more frequently in the columnar than in the squamous epithelium. After 18 wk. controls developed no atypical changes nor malignant tumors. Based on detailed studies of the histologic changes produced by the carcinogen, comparisons are made between the atypical proliferations and human cervical carcinoma *in situ*. (See also the following abstract.)

55-99 MORPHOLOGICAL STUDY OF EXPERIMENTALLY INDUCED ADENOCARCINOMA IN THE UTERINE HORN OF THE MOUSE BY THE 20-MC STRING METHOD. (E., Abstract) Ashitaka, Y., I. Taki, H. Iijima and K. Nasu. *J. Jap. Obstet. Gynec. Soc.* 10(4): 52, 1963.

A piece of cotton thread impregnated with 1 part 0-methylcholanthrene (MC) and 3 parts beeswax was inserted for an av. distance of 0.8 cm into the uterine horn of 110 virgin female NA2 strain mice about 12 wk. old. Upon sacrifice 7-18 wk. later, the uterus and ovaries were removed and examined histologically. Results were as follows: adenocarcinoma of the endometrium (32 cases); adenocanthoma (3); squamous cell carcinoma (2); sarcoma (2). Stromal fibrosis and inflammation of endometrial tissue were constantly observed.

5-100 ESTRONE-INDUCED MAMMARY TUMORS IN THE RAT. I. INDUCTION AND BEHAVIOR OF TUMORS. (E.) Cutts, J. H. (Dept. Med. Res., Western Ontario, London, Canada) and R. L. Noble. *Cancer Res.* 24(7):1116-1123, 1964.

A more detailed account of portions of the paper abstracted as CRA 1(5):873, 1963, devoted to the effects of estrone pellets, chiefly in hooded rats but with some studies in Fischer, Wistar Lewis and Sprague-Dawley rats.

5-101 LYMPHOID TUMOR TRANSFERS FROM XENOPUS LAEVIS TO ALIEN SUBSPECIES AND SPECIES, INCLUDING RANA PIPIENS. (E.) Balls, M. (Station Exp. Zool., U. Geneva, Switzerland). *Cancer Res.* 24(7):1261-1267, 1964.

Lymphosarcoma of the liver, originally methylcholanthrene- or benzpyrene-induced in Xenopus laevis laevis, was 100% transferable (dorsal lymph sac) to members of the same species, to 2 other subspecies (X. laevis petersi and X. laevisectorianus), to another species (X. fraseri) and to 2 other genera (Bufo bufo bufo and Rana cululenta). Similar lymphosarcoma implantations to two strains of Rana pipiens resulted in takes of all of the Vermont and in most of the Wisconsin frogs. These developed lymphoid tumors of spleen, liver, and kidneys, just as in Xenopus, while controls implanted with normal Xenopus liver developed no such tumors. Both strains of pipiens bore spontaneous renal adenocarcinomas (3/65 Vermont; 7/61 Wisconsin), which did not affect lymphosarcoma formation during the 100-day experiment. In 7/9 frogs with both tumor types, the kidney contained separately both epithelial adenocarcinoma and mesenchymal lymphoid sarcoma.

5-102 THE EFFECT OF DIETARY COPPER ON RAT CARCINOGENESIS BY 3-METHOXY DYES. I. TUMORS INDUCED AT VARIOUS SITES BY FEEDING 3-METHOXY-4-AMINOAZOBENZENE AND ITS N-METHYL

DERIVATIVE. (E.) Fare, G. (Dept. Path., U. Birmingham Sch. Med., England) and J. S. Howell. *Cancer Res.* 24(7):1279-1283, 1964.

Among ten rats fed 0.09% 3-methoxy-4-aminoazobenzene in a maize diet for an av. of 463 days, 5 developed liver tumors (adeno- and trabecular hepatomas), 6 ear duct carcinomas, and 4 benign skin tumors. With addition of 0.5% cupric oxyacetate hexahydrate to the diet, no liver tumor appeared, but 7 developed ear duct tumors and 4 skin tumors (av. 452 days). In rats similarly fed 3-methoxy-4-monomethylaminoazobenzene, all developed ear duct tumors and none developed skin tumors irrespective of whether the copper salt was included; among those that received the azo dye alone, 2 formed liver tumors, while those given copper acetate as well developed no liver tumor. It is suggested that copper feeding protects the liver from damage by competing with the carcinogen for available protein-binding sites in the liver. (See also CRA 2(4):#695, 1964.)

65-103 LIGHT MICROSCOPE STUDIES ON THE EFFECT OF N-NITROSOMORPHOLINE ON THE LIVER OF THE RAT AND MOUSE. (Ger.) Bannasch, P. (Inst. Path., U. Wurzburg, Germany) and H.-A. Müller. *Arzneimittelforschung* 14(7):805-814, 1964.

Female BDII rats received N-nitrosomorpholine (NNM), about 12 mg/kg/day (in drinking water) and were sacrificed on day 14-189 of treatment (total 26.8-305.6 mg/animal). Four rats developed hepatic carcinomas without metastases, and in addition, 2 developed cholangiocarcinomas. All 5 rats that died spontaneously (day 175-195; total 303.6-342.2 mg) showed multicentric hepatocellular carcinomas with pulmonary metastases. Of 3 rats which received NNM (8 mg/kg/day), one showed hepatocellular carcinoma with pulmonary involvement after 252 days (total, 296.4 mg). Among 58 male NMRI mice which received NNM, about 16 mg/kg/day within 14-352 days, 16 developed small, usually solid, hepatomas (dose, 57.8-141.2 mg) which became visible macroscopically in only 1 mouse after a dose of 150.1 mg. Two animals developed also simultaneous benign hemangiomas and another one a hemangioendothelioma. Light microscope studies of all the livers are presented in detail, and support the 3 previously proposed phenomena due to chronic liver poisoning with NNM: (1) A rapid loss of glycogen with chromatolysis, frequently leading to a decrease in cytoplasmic basophilia. These effects are regarded as nonspecific with reference to carcinogenesis. (2) Glycogen storage with a decrease of cytoplasmic basophilia. These changes are considered precancerous. (3) Glycogen loss with simultaneous rise in cytoplasmic basophilia (chromatogenesis). These effects are considered as a transition to the carcinomatous stage.

65-104 INDUCED INHIBITION OF CANCER IN RATS. (Ger.) Buttle, G. H. A. (Sch. Pharmacy,

29 Brunswick Sq., London W.C.1) Naunyn Schmiedeberg. Arch. Exp. Path. 247(4):385-386, 1964.

In a paper devoted to tumor inhibition by immunologic phenomena, it is stated that prior treatment with a benzpyrene-induced tumor occasionally inhibited, and sometimes had no effect on transplanted Walker carcinoma. The easily transplantable, "Imperon" iron gluconate-induced mouse cancer was markedly inhibited by pre-treatment with embryonal tissue inj.

65-105 A COMPARISON OF THE CELL CYCLE IN INDUCED CARCINOMAS AND THEIR NORMAL COUNTERPART. (E.) Reiskin, A. B. (Dept. Radiother., Churchill Hosp., Headington, Oxford, England) and M. L. Mendelsohn. Cancer Res. 24(7):1131-1136, 1964.

The kinetics of cell proliferation were studied in tritiated-labeled normal basal epithelium and in 9,10-dimethyl-1,2-benzanthracene-induced epithelial tumors of the hamster pouch. The times (hr.) for various parts of the cycle for normal and tumor cells, resp., were: visible mitosis, 2.6 and 0.4-0.6; DNA synthesis, 10.2 and 6.1; post-synthetic gap, 1.6 and 2.2; entire cell cycle, 142 and 17.6 or 20.7. Thus, tumor cells passed more rapidly than normal cells through all but the post-synthetic gap period, which was longer than normal. Nonmalignant but hyperplastic tissue (probably precancerous) showed an intermediate value for the entire cell cycle, 42 hr. while visible mitosis was 0.5 hr. Since duration of mitosis in tumor cells was much abbreviated, while mitotic index was similar for normal and tumor cells, the unreliability of using the mitotic index for estimating growth rates is emphasized. Though each tissue type divided its cell cycle in different proportions, the only parameter that might possibly distinguish tumor cells from normal or merely hyperplastic cells is the duration of DNA synthesis.

65-106 TISSUE PECULIARITIES OF EXPERIMENTAL RAT SARCOMAS. (Rus.) Tikhonchuk, V. S. (Dept. Histol. Embryol., S. M. Kirov Military Acad. Med., Leningrad). Ark. Anat. 46(8):40-45, 1964.

In a study of rat spinocellular sarcomas (induced i.p. by 3,4-benzpyrene) the peripheral tumor zone showed high nuclear mass (indicated as 138 U) and highest mitotic activity (42 mitoses/100 fields); its fibroblasts showed little differentiation. The intermediate tumor zone had higher fibroblastic differentiation, while nuclear mass and mitotic activity decreased (87 U and 21 mitoses, resp.). The central tumor zone revealed the greatest degree of differentiation, cells were significantly smaller and nuclear mass and mitotic

activity were low (56 U and 11 mitoses, resp.). Glycogen was absent in the cytoplasm of cells in all 3 zones. Thus, malignant connective tissue was seen to preserve its normal properties.

65-107 STUDY ON α -GLYCEROPHOSPHATE DEHYDROGENASE IN THE MITOCHONDRIA FRACTION OF RAT ASCITES HEPATOMA CELLS. (Jap., Abstract) Majima, Y. (Dept. Med. Chem., Chiba U. Sch. Med., Japan), M. Omura, Y. Aso, M. Tezuka and Y. Miura. Seikagaku (J. Jap. Biochem. Soc.) 35(9):592-593, 1963.

In an effort to explain why the α -glycerophosphate (α -GP) in dimethylaminoazobenzene-induced ascites hepatoma cells (AH 130 and AH 7974) in rats is lower than in liver cells in the same animal whereas the α -glycerophosphate dehydrogenase (α -GPD) in the tumor mitochondria is higher than in those of liver cells, the enzyme activity as well as the uptake of C^{14} -amino acid was measured. Since the α -GPD activity in the tumor cells was high very soon after inoc., it is probably not the result of fatty degeneration of the tumor cells but it is due to the markedly increased biosynthesis of the enzyme by the tumor cells. Separation of the cells into fractions--nuclei, mitochondria and supernatant--made it possible to show that the increased incorporation of C^{14} -amino acid into the mitochondria of tumor cells and the increased α -GPD activity took place only in the presence of tumor cell nuclei and similar increase in amino acid incorporation by liver cell mitochondria also required the presence of tumor cell nuclei. Tumor cell nuclei seem to have lost the ability to limit protein production by the mitochondria.

65-108 CHEMICAL CARCINOGENESIS IN THE HAMSTER SUBMAXILLARY GLAND. (E.) Cataldo, E. (Dept. Oral Path., Tufts U. Sch. Dent. Med., Boston, Mass.) and G. Shklar. J. Dent. Res. 43(4):568-579, 1964.

A simple, uniform method for the formation and implantation of 5 mg pellets of powdered 9,10-dimethyl-1,2-benzanthracene in the submaxillary salivary gland of 34 male and female Syrian hamsters (Cricetus auratus; both sexes; age 3-4 mo.) is described. Visible and palpable lesions occurred as early as 3 wk., and at 8 mo. some animals had developed extremely large tumors (fibrosarcomas). Various histologic changes included epithelial hyperplasia and metaplasia, and some areas resembled a tumor of mixed pattern. It was suggested that in the salivary glands of experimental animals usually only one tissue undergoes neoplasia. In the case of the hamster, connective tissue apparently plays this role. (See also CRA 2(4):#696, 1964.)

See also abstract nos.: 6, 8, 14, 23, 26, 30, 39, 147, 154, 201

VIRAL CARCINOGENESIS

55-109 DISTRIBUTION OF VIRAL ANTIGENS IN THE INTERNAL ORGANS AND FIBROUS NODES OF RABBITS INFECTED WITH ROUS VIRUS. (Rus.) Kriukova, I. N. (Gamaleya Inst. Immunol. Epidemiol. Microbiol. Acad. Med. Sci. USSR, Moscow) and I. B. Obukh. Vop. Onkol. 10(8):60-64, 1964.

Newborn chinchilla rabbits were infected with Rous sarcoma (strain Karr; titer 1:10⁴; 0.6-1 ml noc. i.p. or s.c. x1-3 at intervals of 1 day). Fluorescent antibody data revealed no Rous virus (RV); viral antigen was found in the cells of fibrous nodes, regional lymph nodes, liver and kidney but not in the thymus. During the sclerolization and resolution of the fibrous nodes, the antigen disappeared. This corresponds to the time when virus neutralizing antibodies appear in rabbit sera. It is concluded that although RV is multiplying in the rabbit organism, it either does not reach maturity or the viral particles are being blocked by some inhibitor. (See also CRA 2(5):#942, 1964.)

55-110 EXPERIMENTAL STUDIES ON THE MY MOUSE SARCOMA. III. STUDIES ON THE RETICULUM CELL SARCOMA DEVELOPING IN NEWBORN D103 MICE INOCULATED WITH THE CELL-FREE EXTRACT FROM MY MOUSE SARCOMA AND ELECTRON MICROSCOPIC DEMONSTRATION OF VIRUS PARTICLES IN THE SARCOMA TISSUE. (Jap.) Ohmori, M. (Dept. Path., Okayama U. Sch. Med., Japan). Saibokaku Byorigaku Zasshi (J. Jaryopath.) 8(2):69-81, 1963.

Cell-free extracts, injected intracerebrally, of an emulsion of spleen and liver from newborn D103 mice bearing MY sarcoma (which emulsion caused a leukemoid reaction upon transplantation) induced leukemia in 2/124 mice after 3 mo. and 1 reticulum cell sarcoma after 12 mo. No neoplasms developed in 81 controls inj. with heated extracts (55°C for 30 min.). The reticulum cell sarcoma was readily transplantable in the same strain mice. Electron microscopic study of this tumor revealed features related to cells of the RES. In the primary tumor oval type C virus particles were found in the outer coat which measured 110 x 100 mμ and which had a dense inner nucleoid with a diameter of 50 mμ; these were found intercellularly mostly adjacent to the microvilli and cell membrane and rarely in the smooth-surfaced endoplasmic reticulum. No virus particles were found in the transplanted tumor and in the original MY sarcoma.

55-111 EXPERIENCES WITH HUMAN ADENOVIRUS: A POSSIBLE CARCINOGENIC VIRUS IN MAN. (Jap.) Yabe, Y. (Dept. Microbiol., Okayama U. Sch. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 21(6):1255-1260, 1963.

See CRA 2(3):#516, 1964. For related studies, see also CRA 1(3):#465 and #507; ibid., (5):#899 and #900, 1963; ibid. (12):#2059; 2(1):#87, 1964.

65-112 THE ANTIGENS OF HUMAN SARCOMAS AND SARCOMAS INDUCED BY THE INJECTION OF HUMAN SARCOMA EXTRACTS. (Rus.) Bashkaev, I. S. (P. A. Herzen Res. Inst. Oncol., Moscow) and A. I. Ageenko. Vop. Onkol. 10(7):61-64, 1964.

Immunologic studies (using precipitation reaction with rabbit antisera) were conducted on human normal tissue and reticulo-, chondromyxo-, myxo- or fibrosarcomas, as well as on reticulosarcoma (321-KRS) and fibropolymorphonuclear sarcoma (322-KFPS). Both of the latter were induced in Wistar rats by cell-free extracts of human reticulo- and chondromyxosarcomas, resp., and maintained through 6 subsequent passages. Tissue antigens found in both human and rat sarcomas were absent from normal organs and muscle tissue. The antigen was preserved following further tumor transplantation in rats, but serologic tests did not reveal any similarity between this antigen and that of the original human sarcoma.

65-113 ELECTRON MICROSCOPIC STUDIES OF THE MOUSE MAMMARY TUMOR VIRUS. (Jap.) Imai, K. (Dept. Path., Kyushu U. Sch. Med., Japan) and M. Akira, Nippon Rinsho (J. Jap. Clin. Med.) 21(6):1243-1254, 1963.

Electron microscope studies of spontaneous, moderately differentiated mammary tumor in C3H mice showed 2 types of virus particles. The doughnut-form, immature A type virus particles, 80 mμ in diameter, were found not only in the cell surface membrane, limiting membrane of the gland cavity and microvilli, but also inside the cytoplasm. The matured B type virus particles, 100 mμ in diameter, which had nucleoids within the particles, were also observed in the gland cavity, vacuoles and intercellular space. Study of serial sections suggested that in the process of virus maturation, the immature A type virus particles in the cytoplasm moved toward the cell surface membrane, limiting membrane of large vacuoles in the cells, and microvilli. After further progression, the A particles when released by protrusion or budding were mature B type virus particles.

65-114 MALIGNANT PAPILLOMAS OF THE NASAL PASSAGES. (Dan., Abstract) Berendes, J. Nord. Med. 71(16):505, 1964.

In contrast to benign papillomas, which tend to arise in the vestibulum nasi and invade the nasal passages subsequently, malignant papillomas of the nasal passages tend to arise in the posterior part of the nose. Electron microscopy has shown the presence of virus-like particles in inclusion bodies; however, culture studies have not as yet confirmed a relationship to viral infection. This type of papilloma is relatively rare and is an important example of a tumor for which the etiology cannot be clearly established.

- 65-115 STUDY OF THE EFFECT OF SV40 VIRUS ON TISSUE CULTURE AS A PRELIMINARY STEP FOR STUDIES ON CARCINOMA IN VITRO. (Jap.) Yasumura, Y. (Dept. Bact., Chiba U. Sch. Med., Japan) and A. Kawakita. Nippon Rinsho (J. Jap. Clin. Med.) 21(6):1201-1219, 1963.

A cell strain (Vero strain) was obtained by means of tissue culture of grivet monkey kidney in medium YLE¹, which included 2% serum and 0.1% polyvinylpyrrolidone. Monolayers maintained in autoclaved medium (LE¹) without serum, when infected with SV40, developed max. titer of about 10^{7.5}TCD₅₀/ml after 21 days. Plaque titration of SV40 was carried out by using these cells. The plaques appeared at 9 days after infection and finally were counted at 14 days. Protamine sulfate did not influence the number and size of plaques.

- 65-116 POSSIBLE CARCINOGENIC EFFECT OF TISSUE CULTURE EXTRACTS "INFECTED" WITH HUMAN LEUKEMIC BLOOD. (Rus.) Maliugina, L. L. (Inst. Oncol., Acad. Med. Sci., Leningrad) and N. M. Chistova. Vop. Onkol. 10(6):78-81, 1964.

Mice (mostly strain CC57W and in single cases CC57W x C57BL hybrids (9-10th generation), strain C3H, C3Hf and CC57Br; total 597) or rats (suckling Wistar strain; total 49) were treated with culture fluid and extracts from cultures of human lymph nodes "infected" with serum or leukocytic extracts of pts. with various types of leukemia ("infected" cultures (IC)) and original material (extracts from leukocytes and blood serum of leukemic pts. (OM)). Mice treated i.p. with IC developed lung adenoma (6) and tumors of the salivary gland (2); of rats treated with IC (admin. into the brain) one developed cutaneous fibrosarcoma. Among the mice treated with OM, one developed lymphatic leukemia and one hepatoma; among the rats treated with OM two developed ovarian tumors. Among 361 mice and 41 rats which survived until the appearance of the first tumor, 14 and 3, resp., developed tumors. Therefore, in these experiments utilizing active biologic agents responsible for cytopathogenic effects in explants, little effect could be observed. The salivary tumors, which are not characteristic of mouse strain CC57W are, however, typical of neoplasms induced by polyoma virus and possibly originated in connection with the activation of the latent form of this virus.

- 65-117 GROWTH CURVE OF A MURINE¹ LEUKEMIA VIRUS IN MICE. (E.) Rauscher, F. J. (NCI, Bethesda) and B. V. Allen. J. Nat. Cancer Inst. 32(2):269-275, 1964.

In addition to data already abstracted in CRA 1(6): #1131, 1963, no significant difference was found between the time required for demonstrable virus to appear in plasma or spleen. The spleen was the first tissue to show histologic evidence of disease. The significance of the presence of large

amounts of virus in plasma before the development of leukemia is discussed.

- 65-118 INHERITANCE OF SUSCEPTIBILITY TO POLYOMA VIRUS IN MICE. (E.) Chang, S.-S. (Dept. Bact., Natl. Taiwan U. Coll. Med., Taipei) and W. H. Hildemann. J. Nat. Cancer Inst. 33(2):303-313, 1964.

In addition to data already reported in CRA 2(5): #919, 1964, a positive correlation was found between increased susceptibility to malignancy (runting disease and/or tumorigenesis) and reduction in the av. latent period for tumor development. The resistance of C57BL mice to tumorigenesis was associated with a strong tendency for tumors to develop only in the salivary glands, whereas AKR mice and their susceptible albino backcross progeny developed multiple tumors with greater frequency.

- 65-119 LONG-TERM PROPAGATION OF A MURINE LEUKEMIA VIRUS IN AN ESTABLISHED CELL LINE. (E.) Manaker, R. A. (NCI, Bethesda), E. M. Jensen and W. Korol. J. Nat. Cancer Inst. 33(2):363-371, 1964.

Cultures of cells derived from the spleens of suckling BALB/cAnN mice exposed to cell-free preparations of Moloney leukemia virus (MLV) after 7.5 and 14 mo. cultivation did not appear to be as sensitive to infection as were primary spleen cell cultures, since a comparatively longer period of incubation after exposure to virus was required before samples of culture fluids were leukemogenic for mice. The infected cells (designated as MT-77) showed no overt cytopathic changes but released virus continuously during 4 yr. of observation and provided large quantities of MLV-containing fluids. When 2-4-day-old BALB/c mice were inoc. s.c. in the scapular region with 8 x 10⁵ cells of the MT-77 line, tumors (generally soft ones) arose at the implantation site; one of the tumors showed a malignant nature and was probably a reticulum cell neoplasm. Histopathologic examination of tumors arising at the site of implantation indicated their derivation from the implanted cells. No conclusions were possible from these experiments concerning the role of the virus in neoplastic changes.

- 65-120 ASSOCIATION OF RAT VIRUS AND MOLONEY LEUKEMIA VIRUS IN TISSUES OF INOCULATED RATS. (E.) Kilham, L. (Dept. Microbiol., Dartmouth Sch. Med., Hanover, N. H.) and J. B. Moloney. J. Nat. Cancer Inst. 32(2):523-531, 1964.

Rat virus (RV) was recovered in tissue cultures from suspensions of thymic material and spleens of Osborne-Mendel rats, and from plasma concentrates of Sprague-Dawley rats used in the preparation of certain lots of the Moloney leukemia virus (MLV) at different institutions. Suckling wild rats given a preparation of MLV, contaminated

y RV, either died or were moribund within 16 days. Direct examination of their tissues revealed both V hemagglutinins and intranuclear inclusions. The possibility of RV + MLV representing a fortuitous association or a synergistic relation is considered.

5-121 INTRARETICULAR CELL MULTIPLICATION OF LEUKEMIC LYMPHOBLASTS IN THYMIC TISSUE CULTURES. (E.) Ioachim, H. (Francis Delafield Hosp., Columbia U., New York) and J. Furth. J. Nat. Cancer Inst. 32(3):339-359, 1964.

Tissue cultures from thymic lymphomas (TL) induced in W/Fu rats with rat-adapted Gross passage A virus were studied in parallel with those of normal embryonal and adult rat thymuses and observed for 60 days. In postnatal normal thymus cultures, the lymphocytes (LC) disappeared after 2-3 wk. and pure reticular cell growth was established. In TL cultures, lymphoblasts (LB; predominant in supernatant) and reticular cells (predominant in the monolayer) grew in symbiosis. In thymoma cultures, LB were seen in the cytoplasm of reticular cells. Normal and atypical mitotic figures were common in LB inside reticular cells; as many as 30 LB were seen in the cytoplasm of some reticular cells. A small number of LC inside reticular cells was seen in a few embryonal thymus cultures, but in none of the postnatal ones. The symbiosis of reticular cells with LB was reestablished by the supernatant of TL cultures containing round cells. Leukemic LB added to cultures of postnatal normal thymus multiplied in the reticular cells. The lymphomatous LB retained invasiveness in these symbiotic cultures, causing TL that were fatal within 10-16 days, when inj. into young isologous rats.

6-122 IN VITRO TRANSFORMATION OF MICE CELLS BY BOVINE PAPILLOMA VIRUS. (E.) Thomas, M. (Inst. Leukemic Res., St. Louis Hosp., Paris, France), M. Boiron, J. Tanzer, J. P. Levy and J. Bernard. Nature (London) 202:709-710, 1964.

Embryonic cell cultures from mice C3H/eB, C57/BL, and BALB/c inoc. with the bovine papilloma virus (BPV) suspension showed distinct morphological changes within 6-10 days (represented by the appearance of elongated spindle cells at the periphery of the cell sheet, followed by formation of dense, 3 dimensional foci of such cells growing in disorganized patterns). Dilution of the BPV suspension prolonged the latent period. In fetal guinea skin cell culture, the viral suspension induced intense culture proliferation. The activity of the viral extracts on mouse and bovine cells was neutralized in vitro by immune serum obtained from a rabbit immunized with a ferent papilloma virus extract. BPV did not affect the number of chromosomes, but numerous chromatid breaks were noticed in the infected cultures. Attempts to graft the transformed

cells (10⁶ cells s.c.) into isologous strains of newborn or 1-month-old mice produced no tumors during 2 mo. of observation. The addition of grindings or supernatants of mouse embryo, virus-infected cells to C3H/eB mouse embryonic cells or to bovine embryo skin cells induced no further cellular changes. (See also CRA 1(11):#1982 and #1983, 1964.)

65-123 IN VITRO CULTIVATION OF THE MOUSE MYELOID CHLOROLEUKAEMIA VIRUS. (E.)

Prigozhina, E. L. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow) and A. A. Stavrovskaya. Acta Virol. (Praha) [Eng.] 8(3):277-282, 1964.

Successful cultivation of the mouse myeloid chloroleukemia virus (MCLV) in monolayer cultures of mouse spleen cells is reported in detail. Myeloid or reticular leukemia developed within 4-10 mo. in 49 out of 111 newborn mice inoc. with fluids from leukemic cell cultures, and also in 51 out of 110 mice inoc. with fluids from virus-infected mouse spleen cell monolayer cultures. In both series, the leukemogenic activity was definitely displayed by the 1st to 8th in vitro passages of MCLV; a marked decrease in the amount of virus occurred after the 37th passage.

65-124 LYMPHOBLASTIC LYMPHOMA IN BONE-MARROW OF AFRICAN GREEN MONKEYS (CERCOPITHECUS AETHIOPS) INOCULATED WITH BIOPSY MATERIAL FROM A CHILD WITH BURKITT'S LYMPHOMA. (E.) Epstein, M. A. (Middlesex Hosp. Sch. Med., London, W.1), J. P. Woodall and A. D. Thomson. Lancet 2: 288-291, 1964.

Tumor material, removed 5 hr. earlier from a 5-year-old Uganda girl with typical Burkitt's lymphoma, was inoc. i.p. into 4 suckling African green monkeys. Two of 3 survivors (19+ mo.) developed typical Burkitt's lymphoma lesions in the long bones of the limbs. It is concluded that a transmissible etiological agent has apparently been demonstrated in Burkitt's malignant lymphoma.

65-125 AN ELECTRON MICROSCOPE STUDY ON VIRAL CHICKEN SARCOMA. I. A COMPARATIVE STUDY ON THE CHIBA, AICHI-EIKEN, AND ROUS NO. 1 SARCOMAS. (Jap.) Narimatsu, E. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 23(4-5):239-251, 1963.

Sarcomas were induced in 30-day-old white Leghorn chickens by Rous No. 1, Chiba strain and Aichi-Eiken strain viruses. The sarcomas were then removed, frozen, ground and diluted with 3 volumes of physiological saline solution. After centrifuging (15 min. at 3000 r.p.m.), 3 ml. of supernatant, containing virus, was inoc. s.c. into the wings of chickens. Tumors, developing in 7-10 days, were examined by electron microscope. Two types of tumor cells were common to all strains: a spindle-cell type with many Palade granules and

a round-cell type. Endoplasmic reticulum, number of Palade granules, and virus production seem to be correlated. Swelling of mitochondria and number of Golgi apparatuses were more marked in Rous No. 1 and Aichi-Eiken strains than in Chiba strain. In Rous No. 1 strain tumors, the mitochondria showed striking deformation, which may be correlated with active virus production.

- 65-126 AGE EFFECTS ON THE HOST AND TISSUE RESPONSE TO ROUS SARCOMA VIRUS (RSV). (E.) Sigel, M. M. (Dept. Microbiol. Path., U. Miami Sch. Med., Fla.), T. M. Scotti, V. B. Schulz, M. Dorsey, Jr. and S. S. Lefkowitz. Arch. Ges. Virusforsch. 14(4):422-430, 1964.

After peri-embryonic inj. of 10^{-1} - 10^{-2} dilutions of Rous sarcoma virus (RSV), only 4/64 embryos and chicks showed tumors. With the intra-allantoic route (same doses), 8-day-old embryos showed a 60-65% frequency of lesions (small tumors or mixed tumors and hemorrhagic foci mainly in the liver); embryos 9 or more days old showed fewer lesions. A sharp decrease in responsiveness between days 7 and 9 was also seen in embryos inoc. by way of the yolk sac. Inoc. by the i.v. route resulted in higher frequency of lesions (mainly hemorrhagic with some tumors) than with the other inj. routes, and there was no significant difference in the response of embryos up to age 12 days. In experiments with homologous transplantation of whole embryos or specific organs of such embryos into the brains of conditioned rats (X-irradiation + cortisone), 8 and 9-day-old embryo tissues showed the max. degree of malignant transformation with 10^{-2} dilutions of RSV; the response of 15-day-old embryos was of a lower, but still significant, order of magnitude; 3-day-old chick embryos and tissues of hatched chicks showed transformations of 32% and 7%, resp. Only 2/15 rats showed Rous tumors when transplanted with 3-day-old tissues exposed to 10^{-6} dilutions as compared with 8-16 transplanted with 8-day-old tissues mixed with the same amount of virus. (See also CRA 1(3):#509, 1963.)

- 65-127 PATHOGENICITY OF CHICKEN ROUS SARCOMA VIRUS IN MONKEY. (Rus.) Zil'ber, L. A. (N. F. Gamaleya Inst. Epidemiol. Microbiol., Acad. Med. Sci. USSR), B. A. Lapin and F. I. Adzhigitov. Vop. Virus 9(4):498-499, 1964.

Cell suspensions (1:3 of saline) of frozen (FZ) or fresh (FS) chicken Rous sarcoma (Carr strain) were admin. i.m. to 4 newborn monkeys. In an 18 hr. old Macacus nemestrinus, tumor was found at the inoc. site 8 days after the inoc. with FZ (4 ml) and 24 hr. later with FS (5 ml). Biopsy on day 26 revealed fibrosarcoma (F). Transplantation of F to chicks failed on day 26 but was successful in 1/2 chicks when tried on day 75. The monkey died on day 79 with signs of cachexia and with a disintegrating tumor of the hip. A Papio hamadryas, 12 hr. old, developed F about

1 mo. after inoc. of 10 ml of FS. A Macacus rhesus when 18 hr. old received 4 ml FZ and developed a tumor on day 35 which regressed after 100 days. Another M. rhesus, 18 hr. old, after 5 ml FZ and (next day) 5 ml FS, developed 3 nodes, one of which, on day 50, proved to be F; it was not transplantable to chicks. No tumors developed in 12 adult monkeys (6 estrogen-treated, 6 irradiated) after 3-6 mo.

- 65-128 TRANSFORMATION OF EMBRYONIC HUMAN CELLS BY ROUS SARCOMA VIRUS. (E.) Zilber, L. (Dept. Immun. Oncol., Gamaleya Inst., Moscow, USSR) and V. Shevljaghyn. Nature (London) 203: 194-195, 1964.

Explants from a mixture of Rous sarcoma virus (RSV; Schmidt-Ruppin strain) tissue extracts and human embryo cells, tissue cultured for 3 mo. with passages at intervals of 2-3 wk., showed no infectious virus in the medium for up to day 33 of culture. On day 35, the viral antigen was detected by cytoplasmic fluorescence (Coons's fluorescein method), and infected cells showed considerable nuclear enlargement and cytoplasmic vacuolization. Foci of intensive cell multiplication appeared during the third month, followed by multilayered, pluridirectional, finally irregular growth, suggestive of malignancy. Control tissue cultures showed no such transformation nor growth acceleration.

- 65-129 ELECTRON MICROSCOPIC STUDY OF VACUOLATING VIRUS SV-40 IN KIDNEY TISSUE CULTURES OF AFRICAN GREEN MONKEYS AND IN VIRUS SUSPENSION. (E.) Shestopalova, N. M. (Inst. Poliomyelitis Virus Encephal., USSR Acad. Med. Sci., Moscow), V. N. Reingold, G. I. Kolyaskina and M. P. Chumakov. Fed. Proc. (Trans. Suppl.) 23(4) (Pt. 11): T855-T859, 1964.

This article is the English version of a Russian article appearing in Vop. Virus 8(4):466, 1963 and abstracted as CRA 2(2):#293, 1964.

- 65-130 ANTIGENIC DIFFERENCES BETWEEN NORMAL AND POLYOMA VIRUS-TRANSFORMED CELLS. II. IN VITRO EVIDENCE FOR A VIRUS-INDUCED ANTIGEN. (E.) Bases, R. (Inst. Gustave Roussy, Villejuif, Seine, France). Cancer Res. 24(7):1216-1221, 1964.

Hamster and mouse cells transformed by polyoma virus were first sensitized then killed by rabbit antisera against the transformed cells, which previously had been absorbed on cells of non-polyoma origin. The effect was measured by the loss of in vitro capacity to form colonies from single cells. Polyoma-transformed cells were the most susceptible of those tested. One absorbed serum sensitized both a polyoma-transformed mouse cell line and a hybrid cell line derived from it, but not the other parent cell line of non-polyoma origin. These data support the theory that cell

transformation by polyoma virus leads to the appearance of a new cellular antigen.

131 DEOXYRIBONUCLEIC ACID AND PROTEIN SYNTHESIS IN POLYOMA VIRUS-INFECTED MOUSE KIDNEY CELLS IN CULTURE AS STUDIED BY AUTORADIOGRAPHY AND IMMUNOFLOUORESCENCE. (E.) Nowada, J. (Roswell Park Mem. Inst., Buffalo, N. Y.). Gann 55(4):267-276, 1964.

RNA and protein synthesis in Ha/ICR mouse kidney cell cultures infected with polyoma virus (approx. 10⁶ PFU/cell in 0.2 ml phosphate-buffered saline) was studied by means of autoradiography and immunofluorescence. The increase in DNA synthesis in infected cell cultures was found to be due largely to viral DNA synthesis. Protein synthesis, determined by the incorporation of tritiated leucine, occurred continuously in both infected and non-infected cell cultures. Nuclear and nucleolar protein synthesis was greater in infected than in non-infected cells. It is concluded that the synthesis of viral DNA usually takes place before the synthesis of viral specific protein. (See also CRA 1(2):#263, 1963.)

132 A SPONTANEOUS TRANSPLANTABLE C₃H MOUSE LEUCOSIS (NJA). (E.) Olsen, K. (Inst. Gen. Path., U. Aarhus, Denmark). Acta Path. Microbiol. Scand. 61(2):195-210, 1964.

Biological characteristics of this malignancy are described. A standard inoculum (10⁶ cells) of this leukosis named NJA, inoc. s.c. in C₃H mice, produced in 6-7 days a local tumor, high peripheral blood WBC, hepatosplenomegaly, adrenocortical leukemic infiltration, and replacement of bone marrow by malignant cells. Mortality was fairly uniform. The tumor cells are highly sensitive to temperature, tumor take being sharply reduced by use of inoculum incub. at 37°C or frozen to -20°C. Cell-free material was inactive. Attempts at immunization failed. Other mouse strains (Street albino and AK albino) were wholly or partially resistant.

65-133 SURVIVAL OF EHRLICH'S ASCITES CARCINOMA CELLS AT HIGH ULTRA-CENTRIFUGAL FORCES. (E.) Molomut, N. (Waldemar Med. Res. Found. Inc., Woodbury, N. Y.), M. Padnos, V. Satory and L. Gross. Nature (London) 203:740-742, 1964.

Unfiltered 105,000 g supernatants of Ehrlich ascites carcinoma (EAC) after 1 and 5 hr. centrifugation induced EAC in 15-25 days after the i.p. inoc. in Swiss, C₃H and C57BL6 mice. Filtered supernatants of EAC were completely inactive in all mice tested and observed for 90 days. In virulent tumors for which a low LD₅₀ exists, the small number of cells required to induce tumor escape detection in unfiltered ultracentrifugates.

65-134 PATHOGENICITY OF VIRUS B77 IN RATS. (E.) Hlavayová, E. (Dept. Exp. Path., Inst. Oncol., Bratislava, Czech.), J. Smida, Č. Altaner and F. Švec. Folia Biol. (Praha) 10(4):301-306, 1964.

A Rous type of fowl virus, B77, which produces fibromyxosarcomas in domestic fowl and is transplantable to pigeons, turkeys, ducks and pheasants, was found to be pathogenic also to rats. Both tumor cell suspensions s.c. and cell-free virus preparations induced hemorrhagic cystic disease in 81 newborn or fetal Wistar rats; in 7 cases, spindle cell or polymorphocellular sarcomas (RB) were also induced at the inj. site, of which one, RBl, proved to be transplantable to rats and retransplantable to chicks. The tumors induced by RBl were identical with Sarcoma B77 tumors; however, immunologic tests showed that the RBl tumors contained no fowl antigen. Methylcholanthrene-induced tumors in 41 rats inoc. 24 hr. previously with B77 cell suspensions were not transplantable to chicks, hence contained no virus B77, but a cell suspension from a B77-induced cyst wall was transplantable to 4/10 newborn rats. The mechanism of the pathogenesis of fowl sarcoma in rats remains to be elucidated.

See also abstract nos.: 6,24,25,29,50,198

- 65-135 STATISTICAL ANALYSIS OF 1961 SURVEY IN STUDY ON RADIATION-INDUCED CANCER IN HUMAN BEINGS. (Jap.) Masuyama, M. (Dept. Physical Ther., Tokyo U. Sch. Med., Japan). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 23(10):1299-1302, 1964.

Radiation-induced cancer observed in Japan in 1961 was statistically analyzed with reference to sex, age, and history of irradiation. There was a statistically significant difference between the group with tumor (T-group) and the group without tumors (control) with reference to age. A higher dose of irradiation was found in the T-group than in controls.

- 65-136 SOME PROBLEMS ON EPIDEMIOLOGICAL METHOD OF RADIATION-INDUCED CANCER. (Jap.) Kitabatake, T. (Dept. Radiol., Nagoya U. Sch. Med., Japan). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 23(10):1271-1276, 1964.

A detailed study of basic statistical methods used to evaluate data relative to radiation-induced cancer is presented. For matched sample groups, the formula for significance at the 1% level is $N \geq \frac{7(k+1)(2-k-1)}{2(k-1)^2}$, where l is the carcinogenic rate for the irradiated group, k , that for the control group. If it is assumed that the response rate (c) was equal in both groups, the formula needed is $N(1-k-l+c) \geq \sqrt{7} \sqrt{N(1+l+k-c)}$. Where $k = 1.5/10^4$, $l = 10k$, $N = 10,000$, c was limited as follows: $c \leq 30/10^4$. When non-matched sampling was used, the number to be surveyed was limited as $N_1 > \frac{9l}{(1-k)^2}$ in the irradiated group and

$N_2 \geq \frac{9kN_1}{N_1(1-k)^2 - 9}$ in the control group.

- 65-137 RESULTS OF MASS SCREENING EXAMINATION FOR CARCINOMA OF THE CERVIX IN OUR LOCAL DISTRICT. (Jap.) Shinagawa, N. (Dept. Obstet. Gynec., Hirosaki U., Japan), Y. Murata, S. Matsumoto, H. Saitō, A. Takano and A. Murakami. Nippon Sanka Fujinka Gakkai Zasshi (J. Jap. Obstet. Gynec. Soc.) 15(11):1011-1018, 1963.

In a mass screening program for carcinoma of the cervix a total of 1,239 Oriental females were examined (decades 2-6, av. age 41.19 yr.) in the Tsugaru District in Aomori Prefecture, a district regarded as "backward". The examination methods consisted of colposcopy, smear, and biopsy. The incidence of infiltrating carcinoma was 9 (0.72%) and the incidence of intraepithelial carcinoma was 2 (0.16%). The average age of carcinoma pts. was 48.73 years in contrast to the av. age of 41.13 years in non-carcinoma pts. The average frequency of pregnancy in carcinoma and non-carcinoma pts. was 7.33 and 5.47, resp.; the av.

number of deliveries was 6.33 and 4.18, resp. No difference was found in regard to family history of cancer.

- 65-138 THE RELATIONSHIP BETWEEN PULMONARY TUBERCULOSIS AND LUNG CANCER IN VIEW OF PATHOLOGICAL STUDIES. (Jap., Abstract) Kageyama, K. (Keio U. Sch. Med., Japan), K. Shimizu, T. Yamaguchi and S. Goto. Kekkaku (Abstr. Current Lit. Tubercul.) 38(3):123, 1963.

In 200 autopsies performed on pts. who died of lung cancer, 27 showed secondary tuberculous foci, of which one was confirmed as a squamous epithelial carcinoma developing from the wall of a tuberculous cavity. Among 140 cases of surgically resected lung cancer, one cancer appeared to have originated from tuberculous scar formation and one squamous epithelial cancer from a dilated bronchus. In both groups of patients, scar cancers were found in 14 cases; 6 in scars due to silicosis; 1, tuberculosis; 1, parasite eggs; 6, unknown. In 200 surgical and 30 autopsied pts. with lung tuberculosis, no pathological findings suggesting the development of cancer were found.

- 65-139 THE RELATIONSHIP BETWEEN LUNG CANCER AND PULMONARY TUBERCULOSIS IN THE LIGHT OF AUTOPSY FINDINGS. (Jap., Abstract) Kurohane, T. (Res. Inst. Tuberc. Leprosy, Tohoku U., Japan), T. Kondo, J. Sato and E. Ishida. Kekkaku (Abstr. Current Lit. Tubercul.) 38(3):124-125, 1963.

A study of the autopsies of 195 pts. who died of pulmonary tuberculosis, 49 of primary lung cancer and 41 of other lung cancers revealed that no case of cancer developed in a tuberculous scar. Autopsy findings in a 52-year-old female showed discontinuous, atypical cancer-like changes in the cylindric cell epithelium of small bronchial cysts, suggesting a stage in the development of oat cell carcinoma. In the majority of cases the cancer was located in the peripheral bronchioli, suggesting the possibility that congenital malformation of the bronchial tract may be responsible for the development of lung cancer. Between 1954 and 1963, no lung cancer was found among 3000 pts. with pulmonary tuberculosis treated with chemotherapy, and in whom the tuberculous lesions had healed.

- 65-140 PULMONARY TUBERCULOSIS COMBINED WITH LUNG CANCER. (Jap.) Omichi, S. (Inst. Tuberc. Res., Kyoto U., Japan), Z. Kin, S. Ikeda and Y. Okada. Kekkaku (Abstr. Current Lit. Tubercul.) 38(3):121-123, 1963.

In 158 cases of pulmonary carcinoma, pulmonary TB was also seen in 7 cases (4.4%). Of 66 cases of pulmonary carcinoma proved by autopsy, 20 cases also had pulmonary TB (30.3%). TB was also found

30.0% of the cases of carcinoma of the stomach (number not stated). Autopsy revealed few cases in which the pulmonary carcinoma arose in TB lesions. It is suggested that pulmonary TB does play an important role in the development of pulmonary carcinoma.

- 141 BASAL CELL NEVUS SYNDROME. (E.) Clendenning, W. E. (NCI, Bethesda), B. Block and I. C. Radde. Arch. Derm. (Chicago) 113:38-51, 1964.

Report of 6 pts. with hereditary basal cell nevus syndrome (see also CRA 2(1):#135, 1964) is complemented by a detailed review of the literature on this subject from 1896 to the time of report (6 references). Of the pts. reported, 5/6 were men, in whom multiple basal cell epitheliomas developed at ages 21-35; 1/6 was a man in whom myopia developed shortly after puberty. Detailed histories are presented of familial basal cell nevus syndrome and cancer in the families of the pts. There was without a definite family history of cancer) in the first generation descendants in some cases. Cytosome analyses made in 4/6 pts. revealed no discernible chromosomal abnormalities. A possible relationship between the basal cell nevus syndrome and Turner's syndrome was also suggested by the fact that 5/6 pts. showed some degree of brachy-acarpalism; 3/5 with this sign also had demonstrable ovarian fibromas and 1/5 had a probable ovarian fibroma + a uterine fibromyoma.

- 142 TO THE QUESTION ON A BALANCED DISTRIBUTION OF MALIGNANT TUMORS IN LARGE POPULATIONS. (Ger.) Mittmann, O. Krebsarzt 33:196-199, 1964.

A study of combined mortality from malignancies in Denmark and Norway is presented as a comparison to that reported in CRA 1(12):#2206, 1964. Data was for each country separately. Between 1907-1961 (excluding the years of World War II) recorded deaths due to neoplasms among inhabitants more than 1 yr. of age (combined for both countries) increased from 12.4% to 20.5% in males and from 13.1% to 22.5% in females. The combined material showed consistently a somewhat lower percentage of malignancy in males than in females. Thus, the author's study of the combined statistics of Denmark and Norway did not support the compensation hypothesis which states that any change of the total frequency of malignant tumors among males is usually accompanied by a similar change among females, with the exception of pure chance variations.

- 143 BURKITT'S TUMOUR. A POST-MORTEM STUDY OF 50 CASES. (E.) Wright, D. H. (Dept. Path., Makerere U. Coll. Sch. Med., Kampala, Uganda, E. Africa). Brit. J. Surg. 51(4):245-251, 1964.

An analysis of 50 cases of Burkitt's tumor selected from the postmortem records of Mulago Hospital for the yr. 1953-62 revealed the following: maximum incidence (30/50 cases) in the 5-14 yr. age group; male:female ratio of 41:9. Comparison of organ involvement in Burkitt's tumor and other lymphomas has shown a high incidence in the former of jaw (50%) and ovarian (67%; based on number of females) involvement; these sites are rare in other types of lymphomas. In Burkitt's tumor the total incidence of abdominal lymph node involvement is high, while superficial lymph nodes are less frequently involved and rarely massive.

- 65-144 CHANGING MANAGEMENT OF CARCINOMA OF THE THYROID. (E.) Hill, L. D. (Mason Clin., Seattle, Wash.), H. Kellogg, Jr., J. H. Crampton, H. W. Jones and J. W. Baker. Am. J. Surg. 108(2):175-182, 1964.

In a survey of 842 thyroidectomies performed since January 1950, 124 pts. with thyroid carcinoma have been examined at the Mason Clinic. Of 112 pts. in which material was suitable for diagnosis, tumor types were distributed (percentage) as follows: papillary carcinoma 70.5; follicular carcinoma 18.8; mixed follicular and papillary 1.8; undifferentiated 7.1; solid carcinoma with amyloid stroma 0.9; fibrosarcoma 0.9. The female:male sex ratio was nearly 2:1. The av. age was 45 (range 9-79 yr.). The av. age for papillary carcinoma was lower (av. 40 yr.) than for other tumor types; av. age for undifferentiated carcinoma was 66 yr. While the number of thyroidectomies performed per yr. has sharply decreased during the period covered, the yield of thyroid cancer has risen from 4% in the decade 1950-60 to 12.6% since the inauguration of the thyroid suppressive program in January of 1960.

- 65-145 THYROID CANCER. (Sp.) Vidal, E. R., J. Bianchi, R. Cabrini, L. R. Bazzi, H. Parisier and J. Vollenweider. Dia Med. 36(52):1006-1011, 1964.

In a series of 25 pts. with thyroid cancer, 92% were differentiated (11 papillary, 9 follicular, 3 mixed) and 8% (2/25) were undifferentiated. The female:male sex ratio was 3.2:1 (19 females:6 males); age range was 10-80 yr. old, with an av. of 43.7 yr. The frequency of thyroid cancer was 9% in goiter pts. and 5.4% in thyroid-operated pts. In a 10-year-old girl previously thyroid-ectomized, the withdrawal of thyroid hormone treatment after surgery was followed by a recurrence of thyroid tumor, which was diagnosed as follicular carcinoma at subsequent surgery.

- 65-146 CHORIOCARCINOMA IN THE PHILIPPINES. (E.) Acosta-Sison, H. (Dept. Obstet. Gynec., U. Philippines Coll. Med., Quezon City). Philipp. J. Surg. 19(1):27-31, 1964.

In a further report (see CRA 1(2):#319, 1963) the period of observation has been extended for 1 yr. (1962) and includes 17 additional pts.

- 65-147 ARSENIC KERATOSIS AND ARSENIC CARCINOMA. (Ger., Abstract) Mach, K. Klin. Med. (Wien) 19(5):226, 1964.

A case is presented of a 56-year-old winegrower exposed to arsenic preparations in 1938 and 1939, with keratotic changes appearing 1-2 yr. later. At time of report a node from the hand showed the structure of a cornified squamous epithelial carcinoma.

- 65-148 CARCINOMA OF THE GASTRIC STUMP. (Ger.) Bernhard, A. (Dept. Surg., U. Bonn, Germany), B. Kuss and W. M. Bartsch. Med. Klin. 59(36):1413-1417, 1964.

A true gastric stump (GSC) developed in 18 pts. 1 to more than 30 yr. (av. 17 yr.) after resection for peptic ulcer, mostly in pts. aged 40-60 yr. In 5 pts. GSC developed within 3 yrs. (av. 2.4 yr.) following surgery for peptic ulcer. True GSC could be suspected when difficulties develop after a long symptom-free interval, whereas short symptom-free intervals indicate recurrence of carcinoma.

- 65-149 A CASE OF MALIGNANT MESENCHYMAL TUMOR OF SOMATIC SOFT TISSUES WITH PREDOMINANCE OF OSTEOPLASTIC SARCOMA STRUCTURE. (Cz.) Kolář, J. (Clin. Radiol., Fac. Gen. Med., Charles U., Prague, Czech.), J. Janec, M. Janoušková and V. Bek. Acta Chir. Orthop. Traum. Cech. 31(2): 134-138, 1964.

A 32-year-old woman underwent thigh trauma (without bone fracture) while skiing, and 19 yr. later a second trauma involved the same site. Tumor-faction began 2 wk. after the second trauma, and the size of the thigh was greatly increased. Calcification (myositis ossificans post-traumatica), but no pain, occurred. Neoplasm was suspected, and the pt. underwent surgery, with painful recurrence 14 days later which was treated again by surgery, then X-ray. Another painful recurrence plus pulmonary metastases, cough, and dyspnea followed. The pt. died 1 yr. after the second trauma. Histology showed a mesenchymal tumor with predominance of osteoplastic sarcoma. A review (17 references) of pertinent literature is included.

- 65-150 TUMOURS OF THE LACRIMAL GLAND IN KENYA. (E.) Linsell, C. A. and P. Clifford. E. Afr. Med. J. 41(6):263-270, 1964.

The present survey of mixed salivary tumor sites among Kenya Africans was based on 68 bioptic specimens examined from 1957-1961 and revealed

the following incidence: parotid 54%; palate 24%; submandibular 12%; lacrimal 6%; lip 4%. The total male:female sex distribution was 26:42. Two cases (adults) of lacrimal gland tumors are presented in detail. In a discussion (17 references) of the origin and classification of lacrimal tumors, upon histologic examination, Zimmerman found 40% of the epithelial tumors of the lacrimal gland to be malignant.

- 65-151 PATHOLOGICAL STUDY OF CARCINOMA ARISING FROM THE EXTRAHEPATIC BILIARY DUCT, ESPECIALLY WITH REFERENCE TO ITS HISTOGENESIS. (Jap.) Nakayama, I. (Dept. Path., Nagasaki U. Sch. Med., Japan). Nagasaki Igakkai Zasshi (Nagasaki Med. J.) 39(1):20-36 + 2-3, 1964.

Among 56 cases of carcinoma of the extrahepatic biliary duct system seen among 3,310 consecutive autopsies, no significant differences were found in the sex ratio for cancer of the choledochus. The male and female incidence for cancer of the gallbladder was 0.5% and 1.2%, resp. In 16 cases, collateral hyperplasia (proliferation of epithelial cells surrounding carcinomatous tissue with some transition to carcinoma) was also observed. Cholelithiasis was found in association with gallbladder carcinoma in 33% and with extrahepatic biliary duct cancer in 42% of the cases. Histologically, tumors cases were classified as follows: adenocarcinoma (48), squamous cell carcinoma arising from gallbladder and with metaplastic appearance (4), medullary carcinoma (3) and scirrhous cancer (1).

- 65-152 FURTHER CONSIDERATIONS ON THE GEOGRAPHIC DISTRIBUTION OF LEUKEMIAS IN THE CRACOW REGION. REPORT I. ANALYSIS OF RELATIONSHIPS BETWEEN THE ESTABLISHED INDICES OF LEUKEMIC INCIDENCE AND SOME FACTORS IN THE PUBLIC HEALTH SERVICE. (Pol.) Janicki, K. (3rd Clin. Int. Med., Acad. Med. Cracow, Poland). Pol. Arch. Med. Wewnet. 34(5):565-574, 1964.

No correlation was found between the number of doctors available per 10,000 of population and the previously reported geographical differential in morbidity rates of leukemia in the Cracow region during 1955-1960. Thus, the differences in the reported incidence of hospitalized, registered leukemia cases were not due to an uneven distribution of physicians and health service centers, to differences in diagnostic facilities, nor to lack of homogeneity in the basic statistical material. See also CRA 1(9-10):#1775; ibid., 2(2):#374; ibid., (3):#548; ibid., (6):#1169 and ibid., (7):#1379, 1964.

- 65-153 INCIDENCE OF DISEASE IN RELATION TO THE INDIVIDUAL ABO GROUPS AND TO THE Rh(D) SYSTEM. SOME REMARKS BASED ON PERSONAL EXPERIENCE WITH BLOOD DISEASES. (Cz.) Májský, A. (Inst. Hemat. Blood Transfus., Prague, Czech.). Vnitřní Lek. 10(3):253-258, 1964.

ong a total of 641 pts. studied (122 acute leukemia, 75 chronic myeloid leukemia, 73 chronic lymphatic leukemia, 43 reticulosis, 49 myeloma, 30 lymphogranuloma, 30 hemophilia, 16 polycythemia), no relationship was found to blood groups B and O. A definite and significant relationship was found to the Rh₀(D) positive factor in myeloma only.

-154 LUNG CANCER. (Ser.) Milićević, D. (Dept. Surg., Inst. Oncol., Fac. Med., Belgrade, Yugoslavia). *Acta Chir. Iugosi.* [11](3):241-255, 1963.

a 10-yr. period 117 pts. were treated for bronchial carcinoma, of whom 105 (89.8%) were males and 12 (10.2%) females; male:female ratio 9:1. Most of the pts. were 50-65 yr. of age (range = 30-72 yr.). Of these pts. 83% were smokers and 17% were nonsmokers (smokers:nonsmokers ratio = 5:1; in males = 8:1 and in females = 2, resp.). All the pts. smoked for an av. of 15 yr. and averaged 20 cigarettes per day.

-155 OBSERVATIONS ON THE GENETICS OF FAMILIAL GLIOMAS. (Ger.) Metzel, E. (Dept. Neurosurg., U. Freiburg i. Br., Germany). *Acta Genet. Med. (Roma)* 13(2):124-131, 1964.

ong 393 cases of gliomas, 3 were true familial cases; familial brain tumors were suspected in 2 others. In one of the true familial cases, a 10-year-old man with an arachnoidal cyst in the occipital region, family history revealed that his mother died (at age 28) from an ependymoma, and that his mother's brother had surgery for a glioblastoma. A brother of a 21-year-old man who underwent surgery for oligodendroglioma died from age 14 from seizures, with aura indicating possible temporal origin. An astrocytoma suddenly developed in a 53-year-old man, whose son died suddenly at a young age with signs of a tentorial constriction. (See also CRA 2(2):152, 1964.)

-156 PECULIARITIES OF ESOPHAGEAL CANCER INCIDENCE IN THE KZYL-ORDA REGION. (Rus.) Shaposhnikov, V. I. (Kzyl-Orda Distr. Pol. Dispensary, Kazakh SSR). *Vop. Onkol.* 1(1):72-73, 1964.

a total of 388 cases of esophageal cancer recorded in Kzyl-Orda region between 1953-1961, 73% were natives (Kazakhs). This cancer represented 25.7% of all malignancies; the rate was 100,000 population. Average age of Kazakhs was 57.9 yr. while that of settlers was 65 yr. The incidence among native males was 1.5 times greater than that among native females; the rate among urban natives was 1.5 times greater than that among rural natives. Metastases occurred in 33% of the cases. Tumor localization was most

frequent at the middle third, rarer in the lower third and rarest in the upper third of the esophagus.

65-157 COMPARATIVE STUDY OF VARIOUS EXOGENOUS AND ENDOGENOUS FACTORS IN THE DEVELOPMENT OF GENITAL CANCER IN THE ADZHARIAN SSR. (Rus.) Charkviani, L. I. (Maternity Hosp., Batumi, Georgian SSR). *Vop. Onkol.* 10(1):4-48, 1964.

Factors favoring the development of female genital cancer include sterility, abortions, late pregnancies, late menarche, early menopause, interruption of or short-term breast feeding. Smegma and personal hygiene also may play a role. The av. annual rate of genital cancer per 100,000 was 9.8 in Upper Adzharia (chiefly rural with Georgian Moslems) and 42.4 in Batumi; uterine cervical cancer was seen in 4.5 and 19.4 females, resp. Genital cancer rate was 40.6/100,000 employed (urban) and 11.4 in farm workers; incidence of cervical cancer was 18.6 and 4.0, resp. According to nationality, the incidence of cancer of the uterine cervix was 4.2 in Georgian Moslems, 14.6 in Georgian and 27.8 in Russian women. Genital cancer rates were low (9.3) in Upper Adzharia; it was high (50.6) among Russian women. (See also CRA 1(9-10):#1776, 1964.)

65-158 ANNUAL EPIDEMIOLOGICAL AND VITAL STATISTICS 1961. I. VITAL STATISTICS AND CAUSES OF DEATH. Pp. 13-515 in WHO, Geneva, 1964, 741 pp.

A compilation of data for the yr. 1961, including data on the area and population according to the latest census figures for all the countries and territories of the world. For selected countries data are given on estimated population, births, deaths and infant deaths as well as deaths classified according to cause as well as country, age and sex of pt. This is followed by a section on selected causes of death, including malignant neoplasms, in which the data are given by sex, site and age for certain countries and by sex for the other countries of the world. Data are given (separately where available) for leukemias, lymphosarcoma and other neoplasms of the lymphatic and hematopoietic system, and for Hodgkin's disease.

65-159 LEUKEMIA AUTOPSIES IN JAPAN. (E.) Seno, S. (Dept. Path., Okayama U. Sch. Med.), H. Monden, T. Shibata, S. Seki, H. Asakura, H. Hamada, K. Matsuoka, Y. Toyama, T. Katano, K. Hayashi and A. Nakatsuka. *Acta Med. Okayama* 18(1):45-52, 1964.

The percentage of leukemia autopsies/total autopsy numbers showed the following pattern of increase for the period 1957-1961: 4.3 for 1957; 4.9 for 1958; 4.9 for 1959; 5.4 for 1960; 5.2 for 1961.

The survey showed that the increase was due solely to the increased incidence of acute leukemias, chiefly myeloid. A higher rate of acute leukemia in younger age groups was seen for Japan as compared to other countries. There was little difference in the incidence of acute leukemia as related to sex. The mortality rate (per 100,000) for each yr., 1951 to 1958 was, resp., 1.58, 1.67, 1.90, 2.12, 2.28, 2.47, 2.43, and 2.64.

- 65-160 A HEREDITARY AND EPIDEMIOLOGICAL STUDY OF GLIOMA RETINAE. (Jap.) Matsunaga, E. Saishin Igaku (Mod. Med., Osaka) 19(5):1284-1289, 1964.

Familial and epidemiological studies of a total of 69 cases of glioma retinae (31 histologically confirmed) encountered during the 1945-1957 period in Hokkaido showed no correlation with sex, year or geographic (urban, rural) occurrence. The av. age at onset was 2.8 yr., the majority occurring before 4 yr. of age. The incidence in Hokkaido was 4.2/100,000 births. In a study of 54 family histories, only one case was found in a child of a blood relation; this suggests that recessive genes probably are not involved. The rates of involvement of the right eye, left and bilateral eyes were 1:1:1. The mother's age at time of birth of the pt., and the position in the order of births were not significantly related to the occurrence of the disease. Among a group of 38 pts. who survived 5 yr., 28 were married. Of 22 children of these pts. 1 developed glioma, giving a familial incidence of 8% for those with unilateral involvement. In a search in schools for the blind in Japan of pts. with bilateral involvement, only 1 such pt. was found (female) who had 1 child that developed glioma. This may indicate a very high familial incidence in those with both eyes affected.

- 65-161 COEXISTENCE OF CARCINOMA AND TUBERCULOSIS OF THE LUNG. (E.) Greenberg, S. D. (Jefferson Davis Hosp., Houston, Tex.) D. E. Jenkins, D. Bahar, H. I. Schweppe, Jr. and H. Block, Jr. Am. Rev. Resp. Dis. 90(1): 67-76, 1964.

A review of 1,232 pts. hospitalized for pulmonary tuberculosis during 1957 to 1963 showed that 8 of these had coexistent carcinoma of the lung, all being males aged 47 to 71, all cigarette smokers, one a Negro. The 8 case histories, given in detail, showed no conclusive evidence of a causal relationship between the carcinoma and the tuberculosis. However, the parenchymal scarring by the tuberculosis can stimulate epithelial metaplasia and atypical cell proliferation.

- 65-162 CARCINOMA OF THE GALL BLADDER, BILE DUCTS AND PAPILLA OF VATER. (E.) Gupta, R. S., R. Roy and B. N. Ghosh. Indian J. Surg. 26(3):248-261, 1964.

Among 320 operations performed on the biliary tree from 1956-1961, 27 carcinomas were encountered in 17 females and 10 males, age 36-68. Of these, 12 were in the gallbladder (9 females, 3 males), 2 in the cystic duct, 7 in the extrahepatic ducts, 1 in the intrahepatic duct, and 5 in the ampulla of Vater. Most cases (9/12) of gallbladder carcinoma were associated with stones, and presented a long history of gallbladder colic (5-10 yr.).

- 65-163 OROPHARYNGEAL CANCER IN BHOPAL. (E.) Agarwal, V. (Dept. Path., Gandhi Coll. Med., Bhopal, India) and M. M. Arora. J. Indian Med. Assn. 42(11):519-521, 1964.

Analysis of biopsy specimens from 519 cases of malignant tumors in Bhopal, India (1958-1961) showed a preponderance of oropharyngeal carcinoma sites (210 pts., 40.5%); of these, a majority (64%) occurred in the buccal mucosa. This site accounted for 53.6%, 20.12% and 16.4%, resp., in Agra, Bombay and Andhra in India, and for 7.9% in the USA. The incidence of carcinoma of the tongue was 7.7% in Bhopal, 31.46%, 27.49%, and 22.8%, resp. in Agra, Bombay and Andhra, and 35.94% in the USA. All the Bhopal pts. chewed tobacco, betel nut and lime from an early age. This practice is associated with the early incidence of the oral cancers (4th and 5th decades). The malignancies were more common among males (64.4%) than females (35.6%), and among Hindus (83.3%) than Muslims (16.7%). This accords with the habits of the respective populations as regards prolonged tobacco chewing. The predominant histologic type was epidermoid carcinoma (90.5%).

- 65-164 INCIDENCE OF MALIGNANT TUMORS IN THE BANTU POPULATION OF EAST TRANSVAAL. (Ger.) Frey-Wettstein, M. (Masana Hosp., Bushbuckridge, E. Transvaal, S. Africa). Path. Microbiol. (Basel) 27(4):494-498, 1964.

Among a population of 140,000 and within a period of 4 yr., 161 malignant tumors were found, including 42 carcinomas of the uterine cervix, 9 uterus, 11 bladder, 15 liver, 10 skin, 7 malignant lymphomas, 9 melanomas, and 7 Kaposi's sarcomas. Bilharziasis (*Schistosoma haematobium* and *S. mansoni*) was present in 90% of this population, localized mainly in the bladder, skin, uterine cervix, and less frequently in the liver. There may be a relationship between the prevalence of schistosomiasis and carcinomas of uterine cervix and of liver; it is difficult, however, to explain why bladder carcinoma occurs practically exclusively in men. Only 1 case of lung carcinomas was found. This low incidence probably reflects the relatively undeveloped smoking habits in this population. Kaposi's sarcoma occurred on the extremities, in pts. over 50 yr. of age; 6/7 were men. The neoplastic proliferation of RES is very rare among the Bantu, but 7 malignant lymphomas and 3 cases of leukemia were found.

See also abstract nos.: 9, 10, 15, 16, 17, 63, 64, 65

MISCELLANEOUS

165 REGRESSIVE PHENOMENA OBSERVED IN ASCITES SARCOMA OF THE RAT AFTER ITS INOCULATION THE SUBCUTANEOUS ROUTE. (Fr.) Rivi re, M. R. (b. Exp. Med., Cancer Sci. Res. Inst., Villejuif, ne, France), C. Lasne, I. Chouroulinkov and Gu rin. C. R. Soc. Biol. (Paris) 158(3): -440, 1964.

In SP2 ascites sarcoma was inoc. s.c. (whole ascites tumor or ascites cells without fluid; cells ranging from 20 to 120 x 10⁶ cells) into rats (both sexes; age 3 mo. approx.), tumors grew rapidly for 1 wk. and then began to regress as rapidly; by the end of wk. 2 they had completely disappeared. No recurrences were observed over a period of 3 mo. Histologically, during the growth phase the tumors presented typical malignant aspects; during the regressive phase there was an intense proliferation of the stromal connective tissue, followed by sclerosis, which surrounded and then penetrated the tumor graft. When rats were inoc. s.c. with cells of solid SP2 sarcoma, tumors developed in all animals and no regressions were observed.

166 LOCALIZATION AND CARCINOGENESIS EXEMPLIFIED BY EPITHELIOMA IN ANIMALS. (Fr.) Bosse, K. Arch. Klin. Exp. Derm. 219: -159, 1964.

Essentially the same material as in CRA 1(12): 32, 1964.

167 A CASE REPORT OF UTERINE CERVICAL EROSION TRANSFORMED TO CARCINOMA IN 10 MONTHS. (Jap.) Urano, E. (Dept. Path., Wakayama Coll. Med., Japan) and S. Yoshida. Wakayama Igaku (J. Wakayama Med. Soc.) 14(2): -162, 1963.

An Oriental female (age 39) presented initially with a case of granular erosion of the cervix. However, during the course of 18 mo. this erosion developed into squamous cell carcinoma.

168 STUDIES OF THE PHILADELPHIA CHROMOSOME IN PATIENTS WITH CHRONIC MYELOGENOUS LEUKEMIA. (E.) Frei, E. III (NCI, Bethesda), H. Tjio, J. Whang and P. P. Carbone. Ann. N.Y. Acad. Sci. 113(Art. 2):1073-1080, 1964.

In the Philadelphia (Ph¹) chromosome in pts. with chronic myelogenous leukemia was studied after treatment with chemotherapy (busulfan, mercaptopurine, demecolcine, 6-azauridine, vinblastine, vincristine), 8/11 who achieved a partial remission were Ph¹ positive with the chromosome being present in 96-100% of the metaphases scored; in chromosome studies were done on 12/15 who achieved a complete remission, all 12 were Ph¹ positive and it continued to be present in prolonged (up

to 6 mo.) remissions. The Ph¹ chromosome was also present in nucleated erythroid cells and a number of chromosome preparations with frequent polyploid cells contained the chromosome indicating that it may be present in the megakaryocytes. The Ph¹ chromosome was absent from the cultured peripheral blood which indirectly indicates that it is not present in lymphocytes of these pts.

65-169 FAMILIAL BLOOD ANOMALIES AND HEMATOLOGIC SARCOMAS. (Fr.) Bernard, J. (St. Louis Hosp., Paris, France). Nouv. Rev. Franc. Hemat. 4(2):205-210, 1964.

Genetically transmissible biochemical or cellular disorders of the blood and hematopoietic organs are held to be fundamentally different from leukemia and sarcomas in the same organs. With a view to this distinction, the author examines some doubtful situations: familial incidence of leukocyte anomalies in Chediak's syndrome; lack of distinguishing characteristics between Waldenstr m's macroglobulinemia (familial) and macroglobulinemias which appear to be non-familial; agammaglobulinemia in members of families with leukemic subjects; increasing number of chromosomal abnormalities in macroglobulinemic pts. It is suggested that greater effort be made to correlate biochemical, familial and cytogenetic studies in this obscure field.

65-170 CHARACTERISTICS OF A NEW TRANSPLANTABLE OMZH SARCOMA IN A/SN MICE. (Rus.) Voitovitskii, V. K. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow). Vop. Onkol. 10(5): 60-66, 1964.

Homologous transplantation of spontaneous mammary adenocarcinoma (0.3-0.4 ml s.c.) was made in 1-2-month-old A/Sn mice of both sexes. Beginning with the 16th generation, the tumor was transplanted i.m., and ascites was maintained by i.p. inoc. of 5-10 million cells/mouse. During a total of 40 generations the tumor underwent morphological transformation into polymorphocellular sarcoma including a portion with angiosarcomatous structure (OMZh). The cells grew faster than in the original tumor, but their life was shorter. The new tumor and its ascitic variant had marker chromosomes (1 subtelocentric and 2 metacentric) and both had the superdiploid (41-45) number of chromosomes. Both variants were maintained in the original mouse line and grew well when inoc. into the related strain A mice.

65-171 CHROMOSOMAL ANOMALIES IN ACUTE AND CHRONIC LEUKEMIAS. (Rus.) Davidenkova, E. F. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) and N. N. Kolosova. Vop. Onkol. 10(6): 3-7, 1964.

Karyotype studies of bone marrow cells in meta-phase were conducted in 30 pts. (2/30, <15 yrs.; 28/30, 16-60 yrs. of age) with: acute leukemia (hemocytoblastosis) (15); chronic myeloid (9); chronic lymphoid (4); chronic and subacute reticulosis (2). Chromosomal aneuploidy was found in 63.2% of the cells of pts. with acute leukemia; in 58.6% of the cells of myeloid pts.; in 39.8% of the cells of lymphoid pts.; in 52.2% of the cells of pts. with reticulosis and in 10.5% of the cells of 15 normal subjects. Chromosomal aberrations were more pronounced in more severe forms of leukemia. During remissions, 46 chromosomes were usually found. In chronic myeloid leukemia, in addition to significant variation in chromosome number, morphologic changes were apparent in one (Philadelphia chromosome) of the 21 pairs of autosomes.

65-172 FAVORABLE AND UNFAVORABLE BIRTH MONTHS IN CANCER AND SCHIZOPHRENIA. (Dut.)

De Sauvage Nolting, W. J. J. Geneesk. Gids 42(12):263-264, 1964.

Available statistics concerning the birth months of Dutch and Austrian pts. with cancers and 2 groups of Dutch schizophrenics suggest that the likelihood of a given individual's developing one of these disorders is somewhat reduced (by 7.3-9.4% and by 11.0-13.0%, resp.) if the date of birth falls in the months of May, June, July or August. Among a total of 15,091 cancer pts., the curve of relative incidence in relation to the month of birth was identical for 5659 cases of mammary cancer, 5346 cases of g.i. cancer, and 4086 cases of lung cancer. In families with a history of cancer or schizophrenia, the author accordingly recommends that conception be planned to take place in August, September, October or November.

65-173 TUBERCULIN TESTS IN PATIENTS WITH CHRONIC LEUKEMIAS. (Rus.) Solovei, D. Ia. (Dept. Hemat., P. Stradyn Respir. Clin. Hosp., Riga, Latvian SSR). Probl. Gemat. 9(6):33-34, 1964.

In a group of 50 pts. (48-74 yr. of age) with chronic lymphatic leukemia Pirquet's test was positive in 5 (4/5 had no tuberculosis symptoms) and it was positive in 5/27 pts. (16-71 yr. of age) with chronic myeloid leukemia (2/5 without tuberculosis symptoms). In a control group the test was positive in 797/1005. Hypogammaglobulinemia was observed in 13/39 with a negative reaction but in none with a positive reaction. The Mantoux test was positive in 2/9 lymphatic and negative in all of myeloid pts. tested.

65-174 HEPATIC NEOPLASMS IN NATIVE BOTTOM-FEEDING FISH OF DEEP CREEK LAKE, MARYLAND. (E.) Dawe, C. J. (NCI, Bethesda), M. F. Stanton and F. J. Schwartz. Cancer Res. 24(7):1194-1201, 1964.

Solitary, intrahepatic bile duct-tumors were found in the livers of 3/12 large-sized white suckers (*Catostomus commersoni*) taken from Deep Creek Lake, Maryland. The neoplasms contained an unidentified protozoan parasite which also inhabited the bile ducts of tumor-free *C. commersoni*. No tumors were found in smaller specimens examined. Multiple nodular lesions, with the features of minimal deviation hepatomas but possibly representing nodular regenerations, occurred in one brown bullhead (*Ictalurus nebulosus*) from the same lake. Both species are native, bottom-feeding fish. Environmental factors considered as possible etiologic influences include the unidentified protozoan parasite, carcinogenic hydrocarbons from motorboat exhausts, rotenone introduced into the water in fish population studies, and insecticides such as DDT. It is suggested that bottom-feeding fish may be useful indicators of environmental carcinogens. In an addendum, the authors indicate that there is a possibility that the "protozoan parasites" are normal cells in the fish.

65-175 SPONTANEOUS REGRESSION OF RETINOBLASTOMA (Ger., Abstract) Wegner Klin. Mbl. Augenheilk. 144(6):940, 1964.

Two pts. with bilateral retinoblastoma showed spontaneous tumor regression after unilateral surgery. The father of one of these pts. had a histologically diagnosed glioma.

65-176 CELL STRAIN OF HUMAN BREAST CANCER. (Rus.) Dobrynin, Ia. V. (Inst. Clin. Exp. Oncol., Acad. Med. Sci. USSR, Moscow), R. P. Dirlugian and E. E. Mirzoian. Vop. Onkol. 10(7):42-49, 1964.

Attempts to grow human breast cancer (CaMa) *in vitro* were successful in 15/33 trials; in 7/15 only cellular elements of stroma were found, while in 8/15 mixed atypical epithelium and connective tissue growth were seen; successful passage was obtained in only 1/15. Growth of fibroblast cells was noted during early passages; later, foci of epithelium-like cells appeared which later displaced all other forms. Inoc. of this strain (after approx. 6.5 mo. of cultivation and 18-20 passages) to 1-2-month-old hamsters treated with cortisone resulted in the appearance of nodules at the inj. site in 6/10 animals; all eventually regressed. Histologically, the nodules resembled solid cancer. Chromosome studies of passage 74-77 indicated the strain was subtriploid, since 36/100 slides showed nuclei with 62 chromosomes. In 8% of the cells, 84 chromosomes were found; in 8%, over 100; in 17%, 45. No marker chromosomes were seen.

65-177 THE SO-CALLED HOMOGENEOUS PROPERTIES OF CELL STRAINS FROM HUMAN TUMOR AND NORMAL TISSUES. (Rus.) Kolmykova, V. N. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow) and A. M. Eroshkina. Vop. Onkol. 10(7):57-60, 1964.

Immunologic studies in guinea pigs sensitized with human embryonic skin epithelium (strain 580) and muscle fibroblasts (strain 630) and angiosarcomas (strains As and 709) revealed the presence of common antigens characteristic of malignant tissue. Angiosarcoma cells also showed an absence of antigens found in normal adult or embryonic cells or embryonic cells undergoing differentiation. It is concluded that normal and malignant cell strains possess certain immunologic properties which permit them to be differentiated from each other.

178 DIPLO-Ph¹-CHROMOSOME IN MYELOID LEUKEMIA. (Ger.) Hampel, K. E. (Dept. Path. Anat., Free U. Berlin, Germany). Klin. Wschr. 111:522-524, 1964.

8-year-old man with chronic myeloid leukemia at least 4 yr. duration and with previous irradiation therapy was treated cytostatically then only with methylprednisolone for 4-6 mo. before undergoing chromosome studies (in leukocyte cultures). Transformation to an acute myeloblastic phase and death occurred 28 mo. after initiation of chemotherapy. The chromosome studies showed endo reduplication in 8% of the metaphases, numerical and structural abnormalities, absence of the Ph¹-chromosome in 17% of the cells, of small acrocentric chromosomes (#21-22 Y), and a diplo-Ph¹ chromosome in 2 cells.

179 HETEROTRANSPLANTATION OF TRANSPLANTABLE TUMORS AFTER THE PREPARATION OF DONORS. (Sov.) Novikov, D. K. (Dept. Path. Anat., Vitebsk Inst., USSR). Vop. Onkol. 10(4):47-53, 1964.

Sarcoma 45-bearing rats received 2 or 6 s.c. injections of normal mouse tissue suspension, and 4-6 days after the last injection their tumors were transplanted s.c. to random bred mature mice. One group of mice also received 2-3 injections s.c. of normal tissue 10 days prior to another group after removal of Sarcoma 180. Both groups served as donors of rats into which Sarcoma 180 was transplanted 5-18 days after the last injection of rat tissue. 17 passages during 6 mo. Sarcoma 45 grew in 1/255 mice (av. 51%). Most animals died from hemorrhage on days 9-14 following transplantation. After 12 passages in rats over a period of 10 mo., Sarcoma 180 grew in 146/197 (av. 74%) animals as compared to 28.5% of controls; however, its growth in rats was temporary and the tumors gradually regressed after day 12. Thus, preparation of the organism by heterologous tissues facilitates the heterologous transplantation of tumors otherwise incapable of growing in incompatible organisms. As a rule, the tumors retained their original form and their biological properties were changed somewhat.

180 SPONTANEOUS PITUITARY TUMORS AS A FREQUENT PHENOMENON IN WHITE RATS IN THE LABORATORY. (Ger.) Griepentrog, F.

(Natl. Dept. Health, Max-von-Pettenkofer Inst., Berlin-Dahlem). Beitr. Path. Anat. 130(1):40-50, 1964.

Laboratory dissection revealed fully developed, spontaneous pituitary tumors (all chromophobic adenomas) in 0/225 Wistar rats, 7/251 Sprague-Dawley rats and 121/1397 rats bred from random purchases not identified with any strain. In none of the affected rats (total, 128/1873) was any evidence of functional pituitary deficiency found, although the gland was obviously damaged in a majority of cases. Tumor incidence may have been related to some chronic viral or bacterial infection.

65-181 SKIN EPITHELIOMA RESULTING FROM THE SINGLE ACUTE TRAUMA BY CORNIFIED MATTER AND TEETH. (Rus.) Tolev, I. (Dept. Skin. Venereal Dis., I. P. Pavlov Inst. Med., Plovdiv, Bulgaria). Folia Med. (Plovdiv) 6(4):265-268, 1964.

Continuation of studies on the incidence of traumatic skin epithelioma in patients presented in CRA 1(6):#1197, 1963. Among 20 patients who were subjected to a single acute trauma by teeth or animal cornified material there occurred 7 spinocellular epitheliomas (6 lower lip, 1 nose) and 13 basocellular epitheliomas (6 cheek, 4 nose, 3 eyelid). In most of these patients the trauma resulted from routine incidents of everyday life, and rarely from the professional or accidental circumstances. Four case histories are presented in detail.

65-182 TRANSFORMATION OF SOME CHRONIC DERMATOSES INTO MYCOSIS FUNGOIDES. (Rus.) Kalamkarian, A. A. (Dept. Dermatol., Centl. Inst. Dermatol. Venereal Dis., Moscow). Vestn. Derm. Vener. 38(9):13-18, 1964.

Four cases are presented in which mycosis fungoides (MF) was preceded by psoriasis, parapsoriasis or lichen ruber planus. The author thinks that at present it is difficult to reject completely the possibility of the transformation of these lesions to MF.

65-183 SUCCESSIVE FEEDING TESTS WITH THE SPLEEN OF RATS HAVING EXPERIMENTAL LEUKEMIA (HAMAZAKI-A STRAIN). (Jap.) Miura, K. (Dept. Path., Okayama U. Sch. Med., Japan). Saibokaku Byorigaku Zasshi (J. Karyopath.) 8(2):103-108, 1963.

Feeding young albino rats with 1.0 g every 3 days of a mixture of leukemic spleen, liver, and mandibular lymph node tissues obtained from albino rats in which Hamazaki-A leukemia had been induced by i.p. administration of N.Y. tumor gave rise to leukemic infiltration in the liver and spleen with large-sized lymphocytes as well as a marked infiltration of mesenchymal cells. Successive feedings of liver, spleen, and lymph node tissues thus obtained with the use of other young albino rats shortened the

length of time necessary for such leukemic changes to develop (to 3-4 days at passage 8, as compared with an av. of 6 days at the beginning). The animals often died early, taking an acute course, which in turn made it difficult to conclude that the pathologic changes were definitely leukemic but the feeding to adult rats of these tissues resulted in the development of typical leukemia, thus supporting the assumption that the pathologic changes in these young albino rats were leukemic.

65-184 MALIGNANT MELANOMA OF EYE OCCURRING IN TWO SUCCESSIVE GENERATIONS. (E.)

Bowen, S. F., Jr. (Dept. Ophthalm., St. Louis U. Sch. Med., Mo.), H. Brady and V. L. Jones. Arch. Ophthalm. (Chicago) 71(6):805-806, 1964.

Two cases of malignant melanoma of the eye are presented in a 45-year-old female and (10 yr. later) in her 26-year-old daughter. Her 2 brothers and father had no tumors. There is no evidence that the mother and daughter cases were definitely hereditary in nature, but it is possible that hereditary transmission did play a part.

65-185 ACQUIRED RESISTANCE AGAINST THE GROWTH OF YOSHIDA SARCOMA CELLS IN DONRYU RATS. (E.)

Sato, H. (Cancer Res. Lab., Tohoku U., Sendai, Japan), H. Satoh and K. Fujii. Tohoku J. Exp. Med. 81(4):297-314, 1964.

Acquired resistance against the growth of Yoshida sarcoma cells (YS) was studied in Donryu rats (both sexes; wt. 70-100 g) under various pretreatment conditions. The most prominent resistance was shown in rats which received heterografts of various YS ascites of the mouse. Moderate resistance was seen following inj. of BCG or typhoid-paratyphoid vaccine. Lesser degrees of resistance were seen after pretreatment with trypan blue, zymosan or India ink.

65-186 SIMULTANEOUS OCCURRENCE OF PERNICIOUS ANEMIA AND LYMPHOCYTIC LEUKEMIA. (Ger.)

Bakos, B. (2nd Dept. Med., U. Szeged, Hungary) and M. Tényi. Folia Haemat. (Leipzig) 81(4):423-430, 1964.

A 77-year-old man, with pernicious anemia (PA) diagnosed 8 yr. previously, remained free of symptoms after 3-4 yr. treatment with vitamin B₁₂, despite neglecting to continue his therapy; he presented with symptoms of not only PA, but also of chronic lymphatic leukemia (CLL). Treatment with B₁₂ brought about remission of not only PA but also of CLL, and this surprising double effect leads the authors to believe that the simultaneous incidence of PA and CLL is not a random chance occurrence but rather a manifestation of some yet unknown relationship between the two diseases.

65-187 DISCUSSION OF THE ARTICLE BY MAISIN ENTITLED: 'STUDIES ON IMMUNOPROPHYLAXIS IN EXPERIMENTALLY INDUCED CANCER'. (Fr.)
Editorial. Bull. Acad. Roy. Med. Belg. 4(5):350-358, 1964.

In reply to questions concerning a previously published work (see CRA 2(6):#1023, 1964), J. Maisin reported that two groups of rats received either 3 inj. of tumor microsomes (TM) alone before carcinogenesis (Group 1) or 3 inj. of TM before carcinogenesis + 1 challenge dose of TM/mo. after carcinogenesis (Group 2). Group 2 showed a marked decrease in the number of tumors and their latent period; this indicates that the microsomes provoked a favorable immunologic reaction. The author asserts that although a different specific antigen was obtained in each tumor in the same animal induced by the same carcinogen, there are cases where a common antigen was found. The responsibility for the immunologic state seems to rest with the protein fraction of the ribosome in most cases; the same effect was obtained by the author with thymus homogenates as with direct tumor grafts, although he was unable to define which part of the homogenate was active.

65-188 BRONCHOGENIC GRANULAR NEUROMA WITH SYNTOPIC SQUAMOUS EPITHELIUM CARCINOMA. (Ger.)

Tessmann, D. (Inst. Gen. Spec. Path., U. Rostock, Germany) and E. Kochan. Thoraxchirurgie 11(6):702-709, 1964.

A case history is presented of a 50-year-old man with a bronchogenic granular neuroma in which a squamous epithelium carcinoma developed. The pt. smoked 4-5 cigars/day. The possible relationship between granular neuroma and carcinoma etiology is discussed. With certain reservations, it is concluded that the proliferation of the bronchial epithelium, induced by the granular neuroma, is the basis for the development of the squamous epithelium carcinoma.

65-189 AN ENZYMATIC AND ELECTRON MICROSCOPIC CHARACTERIZATION OF A VARIANT OF THE CLOUDMAN S-91 MELANOMA. (E.)

Hirsch, H. M. (Dept. Path., U. Minnesota Sch. Med., Minneapolis) and A. S. Zelikson. Cancer Res. 24(7):1137-1153, 1964.

A genetic variant is described of the Cloudman S-91 mouse melanoma which, after prolonged tissue culture, had been re-established in DBA mice. This variant, intermediate between the melanotic and amelanotic melanomas, showed wide color variations (light to dark) within and among individual tumors. Variant tumor cells contained numerous melanosomes but few mature melanin granules. They possessed a low phenolase complex activity, though not lacking in tyrosinase or dopa oxidase, the block in melanogenesis consisting of a reduced capacity to convert tyrosine to dopa. The

inhibitor involved was inactivated with time (or temperature), permitting greater pigmentation in older tumors. Electron micrographs showed that the site of phenolase complex activity was located at the endoplasmic reticulum, where the formation of osmiophilic Type A particles is described, similar to those in the original Cloudman S-91 or.

190 AMINO ACID CODING IN A SUBCELLULAR SYSTEM DERIVED FROM THE L1210 MOUSE L-LEUKEMIA. (E.) Ochoa, M., Jr. (Dept. of Phys., Columbia U. Coll. Phys. Surg., New York, N.Y.) and I. B. Weinstein. Proc. Nat. Acad. Sci. 52(2):470-477, 1964.

For a more detailed account of the paper abstracted in CRA 2(7):1386, 1964.

191 DEMONSTRATION, PURIFICATION, AND PARTIAL CHARACTERIZATION OF ABNORMAL (HSL) ANTI-GENES IN STABLE HUMAN CELL LINES. (E.) Arney, J. (S. Jersey Med. Res. Found., Camden, N.J.) and L. L. Coriell. J. Nat. Cancer Inst. 2(2):285-301, 1964.

Using agar microimmunodiffusion test methods, the presence of abnormal (HSL) human stable line antigens has been demonstrated in the following human cell lines: HeLa-SJ, HeLa-MBA, HeLa-S3; human conjunctiva, Syverton's embryo esophagus, human liver and J-111. HSL was not detected in human's human intestine, Detroit-6, WI-38, SJ-DHL (normal diploid strains), and was not found in a variety of conc. extracts of fresh human organs. HSL was not associated with contamination by mycoplasma-like organisms. The purest HSL preparations obtained from HeLa-SJ by ammonium sulfate fractionation yielded absorption spectra characteristic of protein and were inactivated by trypsin. Other properties of HSL have been extensively investigated. Electrophoresis indicated the inhomogeneity of this material.

192 PSYCHOSOMATIC ASPECTS OF NEOPLASTIC DISEASE. Proc. Third Internat. Congr. Internat. Psychosom. Cancer Study Group. Newnham Hall, Cambridge, England, July 22-26, 1963. (Eds.) D. M. and L. L. Leshan (Eds.). J. B. Lippincott Co., Philadelphia, 1964, 231 pp.

This publication contains the papers, given at the Conference, which cover a wide variety of subjects, from experimental work on animals through to those supported by clinical observation to the purely speculative and philosophical. Clinical observation together with personality analysis of cancer pts. suggests that the incidence of cancer is greater in persons subjected to emotional stress. Personality differences are noted, for example in pts. with breast cancer, but these may be due to the same endocrine differences which favor the appearance of breast cancer.

Personality differences relating to cigarette smoking and inhaling in relation to lung cancer are also explored. A neuroendocrine factor is suggested in the genesis of leukemia. In rats, early stressful experiences seemed to be related to the number of tumor takes following s.c. injection of tumor suspensions. The papers are interesting and, as Sir S. Cade remarks in the Foreword, "should be studied critically, but without prejudice" because of the novelty of this approach to the cancer problem. References follow each section (approx. 325). (See also CRA 2(1):#133, 1964.)

65-193 HERMAPHRODITISM WITH "ATYPICAL" OR "MIXED" GONADAL DYSGENESIS. RELATIONSHIP TO GONADAL NEOPLASM. (E.) Sohval, A. R. (Mt. Sinai Hosp., New York). Am. J. Med. 36(2):281-292, 1964.

After an extensive review (67 references) and discussion, a case is presented of a 20-year-old Negro woman with a vestigial "streak" gonad on one side and a dysgerminoma (with hilus or Leydig cells) on the other.

65-194 MALIGNANT CHANGE OF A FOCUS OF MULTIPLE CHONDROMATOSIS. (Rus.) Glushkovskii, A. E. (N. A. Semashenko City Hosp., Smela (Cherkas Distr.) USSR). Vestn. Rentgen. Radiol. 39(4):72-73, 1964.

A case is reported of chondrosarcoma which developed in the arm of a 20-year-old male who showed multiple chondromatosis of the upper extremities, scapula and humerus.

65-195 THE RELATION OF NUCLEOLUS TO THE NUCLEUS IN NORMAL AND CANCEROUS EPITHELIUM OF THE RECTUM. (Rus.) Lavrenko, V. V. (Dept. Histol. Embryol., S. M. Kirov Military Acad. Med., Leningrad). Arkh. Anat. 46(8):53-58, 1964.

In a study of the epithelium of the rectum, the nucleus-cytoplasm ratio in that of 39 pts. with cancer was 1:0.7 to 1:1.9 (dependent on the degree of malignant change) compared to 1:3.2 to 1:3.83 in that of normal subjects. The nucleolus-nucleus ratio was 1:6.4-1:9 as compared with 1:28.4-31.8 in controls. There was a marked increase in DNA and RNA in malignant cells. Both the absolute increase in size of the nucleolus and especially its great increase relative to the nucleus can serve as one of the morphological indices of increased protein biosynthesis and can also reveal the degree of malignization of rectal epithelium. (See also CRA 1(5):#845, 1963.)

65-196 CHROMOSOMES OF HUMAN TUMORS. V. CHROMOSOMAL ALTERATION IN THE METASTATIC LESION OF A MAXILLARY CANCER. (E.) Maeda, M. (Dept. Otorhinolaryng., Wakayama Coll. Med., Japan),

T. Tabata, S. Kusuyama and T. Kimura. Wakayama Med. Rep. 8(2):85-91, 1964.

Surgical excision of a maxillary tumor from a 39-year-old pt. was followed by X-ray treatment of the lesion. A metastatic tumor appeared in the neck region about 6 mo. later. Histologic examination of both tumors showed a characteristic pattern with a modal number of 76 chromosomes in the primary tumor and a wide distribution (from diploid to higher ploidy range) without any significant peak in the metastatic tumor.

65-197 CHROMOSOME ABNORMALITY IN THREE CASES OF LYMPHATIC LEUKAEMIA IN CATTLE. (E.)

Gustavsson, I. (Roy. Vet. Coll., Stockholm, Sweden) and G. Rockborn. Nature (London) 203: 990, 1964.

Tissue-cultured erythrocytes from cows with lymphatic leukemia (3 cows and the 6-month-old fetus of one) showed (among 100 or more metaphases of each were analyzed) 59 chromosomes, one of which was morphologically different from the normal. This subtelocentric chromosome, presumably, originated from a translocation or a fusion of chromosomes 1 and 29. Bone marrow and kidney of the fetus showed the same chromosome abnormality.

65-198 DOES A CONNEXION EXIST BETWEEN BLOOD GROUP MODIFICATIONS OBSERVED IN LEUKAEMIA AND CERTAIN CHROMOSOMAL ALTERATIONS? (E.)

Ducos, J. (Ctr. Blood Transf. Hemat., Purpan Hosp., Toulouse, France), J. Ruffie, Y. Marty, A. M. Salles-Mourlan and P. Colombies. Nature (London) 203:432-433, 1964.

The case is cited of a pt. with acute myelogenous leukemia whose original blood group, A1, was altered during his illness by diminution of the antigenic substance A without a corresponding increase of substance H. Since H production is controlled by gene Xx and this pt.'s karyotype showed also an abnormal constriction of a chromosome pair in the 6-12 group, it is postulated that the locus of the Xx gene may be situated in this 6-12 group of chromosomes. If, however, the genetic deficiency were produced on the molecular level, it would be useless to attempt to find it microscopically in those leukemias presenting blood group modifications.

65-199 THE STIMULATORY EFFECT OF HETEROLOGOUS FIBROBLASTS ON THE GROWTH OF HUMAN

CARCINOMA CELLS IN VITRO. (E.) Mottet, N. K. (Dept. Path., U. Washington Sch. Med., Seattle) and C. McCoy. Lab. Invest. 18(8):930-933, 1964.

Explants from a human epidermoid carcinoma (HEp-3)

were incub. for 96 hr. in a tissue culture medium along with chick embryo fibroblasts. After 48 hr., the area of the outgrowths exceeded the area of the original explants by 3 times. Controls, grown without added fibroblasts, attained this size only after 96 hr.; at 96 hr. the carcinoma explants with fibroblasts exceeded their original area by 5.5 times. Mouse fibroblasts had a similar but smaller stimulatory effect on the growth rate of carcinoma cell cultures. The proximity of the fibroblasts did not alter the differentiation of the carcinoma cells, however. Since the stimulatory effect was seen before there was contact between tumor cells and fibroblasts, a nonspecific stimulatory factor, probably a metabolic product of the fibroblasts transmitted through the medium, is postulated.

65-200 MALIGNANT CRYPTORCHISM. (Jap.) Kondo, I. (Dept. Urol., Yokohama U. Sch. Med., Japan). Hinyokika Kiyo (Acta Urol. Jap. Kyoto) 10(4):206-212, 1964.

Three cases are reported of seminoma arising from an abdominal testicle in a 33-year-old pt. and in 2 pts. (both age 27 yr.) with inguinal testes. A literature review of malignancy in cryptorchism is presented (23 references). It is concluded that orchiopexy is of little value in preventing this malignant transformation and careful follow up after the operation is necessary. Orchiectomy is advisable in cases of cryptorchism after puberty.

65-201 VARIATION IN THE RESPONSE OF XENOPUS LAEVIS TO NORMAL TISSUE HOMOGRAFTS. (E.)

Balls, M. (Dept. Exp. Zool., U. Geneva, Switzerland) and L. N. Ruben. Develop. Biol. 10(1):92-104, 1964.

Of 75 normal Xenopus laevis South African clawed toads given normal tissue homografts (spleen, kidney) to the dorsal lymph sac, 2 developed lymphosarcomas at the implant site and in the viscera while 9 developed visceral lymphosarcomas (liver, spleen, kidney), but not at the implant site. Normal kidney implants to 30 forelimbs produced 5 certain and 10 questionable cancers. In some individuals, accessory limbs were formed. Normal muscle, implanted to 10 limbs, produced lymphoid tumors in all at the site of implant and in the viscera. These tumors metastasized to their regenerating contralateral forelimbs; the development of the latter was somewhat retarded. Another group of homografts of liver, spleen, and kidney to toads of the same mating produced no lymphosarcomas in the hosts. The possible presence of latent tumor factors in host or donor is considered; the possible tumor-stimulating role of the urethan used for anesthesia is noted.

ERRATA:

2(4):#803, 1964. Change pagination to 32-36.

2(6):#1061, 1964. Line 3, compound noted as 3-DAB has been identified as 3'Me-DAB.

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ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	.mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	(Cytopathic effect)	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonulcease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	lc.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	In.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

202 THE CONSUMERS UNION REPORT ON SMOKING AND THE PUBLIC INTEREST. (E.)

echer, R., E. Brecher, A. Herzog, W. Goodman, Walker (Eds.). Consumers Union of U.S., Inc., Vernon, N. Y., 1963, 222 pp., \$1.50.

Part 1 of this report is entitled "The Medical Evidence" and includes clinical, experimental and statistical evidence of the markedly increased rate of lung cancer among cigarette smokers. Objections to and criticisms of the various surveys and conclusions are also widely discussed. At least 15 known carcinogens have been identified in tobacco smoke, and cigarette smoke may contain many more carcinogenic substances. Cigarette smoke is also discussed as a cocarcinogen, parameter of bronchial cilia and chronic irritant. Other factors contributing to increased lung cancer rates, such as heredity, viruses or air pollution, are mentioned. The report includes data on the relationship of smoking to other diseases, estimated deaths in the U.S.A. from all causes. Ways to cut the risk (safer cigarettes, filters, switching to pipes or cigars, stopping smoking and many others) are discussed. The remainder of the report deals with problems of advertising and public relations in the smoking industry, suggested points for a program to point out the hazards of smoking, anti-smoking drugs, the merits of cigars vs. cigarettes and tar and nicotine content of various cigarettes. (No references)

203 PERSPECTIVES IN IMMUNOTHERAPY OF TUMOUR DISEASES. (E.) Koldovsky, P.

Inst. Exp. Biol. Genet., Czech. Acad. Sci., Prague. Urologia (Treviso) 31(2):142-148, 1964. This review discusses carcinogenesis in terms of development of a new, tumor-specific antigen concomitant with the cellular change to malignancy, and its demonstration by isoimmunity methods. It touches briefly on comparative growth rates of preimmunized hosts and their controls; the use of homologous and isologous antisera; the importance of antiserum dosage for efficacy; and on transplantation immunity studies. See also CRA 1(5):#791, 1963. (23 references)

204 TOBACCO CRAVING. (Ger.) Bernhard, P.

(47 Kaiser Friedrich St., Duisburg-Born 41, Germany). Med. Mschr. 18(8):344-348, 1963. This review discusses the higher incidence and aggravation of various diseases in smokers (as compared to nonsmokers) and discusses and reviews. Per 100 pts., incidence of cancer by site for smokers and nonsmokers, was, resp.: larynx, bronchus, and oral cavity, 90% and less than 10%; pharynx, tongue, esophagus, and urinary tract, 80% and less than 20%; stomach, rectum and anus, 60% and less than 10%; gastric cancer, about 50% and 50%. Skin

and intestinal cancers were more frequent in non-smokers. Tobacco craving is viewed as a serious social and health problem. (26 references)

65-205 THE RISK OF CANCERISATION ARISING FROM THE THERAPEUTIC USE OF CERTAIN CHEMICAL AGENTS. (E.) Truhaut, R. Excerpta Med. (Ser. LXXV) 3:107-112, 1964.

Examples of carcinogenic or potentially carcinogenic pharmacological substances are listed. Prohibition of the use of Thorotrast and inorganic salts of arsenic is indicated; diethylstilbestrol, however, should not be prohibited in cases of prostatic cancer or mammary cancer in postmenopausal women. Particular caution is indicated with children. The use of aminopterin for psoriasis and of alkylating agents as antiphlogistics should be forbidden. A classification limiting or allowing the use of drugs is suggested. All new drugs, and particularly those administered in long term treatment or designed for children and pregnant women should be tested for carcinogenicity. (No references)

65-206 OCCUPATION AND CANCER. (E.) Wade, L. Arch. Environ. Health (Chicago) 9(3):364-374, 1964.

This review deals chiefly with the literature on scrotal cancer of British chimney sweeps, its rate of incidence, age at incidence and mortality, anatomic localization, and geographic distribution. Other pertinent factors considered are personal hygiene, trauma, soot as an etiologic agent, and innate susceptibility to cancer. Environmental cancer in general is discussed, and a schematic representation is offered of ways in which an organism and its environment may interact to promote carcinogenesis. (32 references)

65-207 OCCUPATIONAL EXPOSURE AS A FACTOR IN RESPIRATORY IMPAIRMENT. (E.) Šarić, M. (Inst. Med. Res., Zagreb, Yugoslavia). Arh. Hig. Rada 14(4):327-357, 1963.

In this comprehensive review, a brief section on occupational cancer of the lung mentions the findings of more than 25 publications on dusts or fumes, and vapors or gases as pulmonary carcinogens. Industries implicated are the nickel, chromate, asbestos, and sheep dip (arsenic) manufacturing industries, also arsenic in agricultural sprays and from smelters; radioactivity in uranium mines and in other mines worked for copper, iron, silver, bismuth, arsenic, and cobalt; and exposure to gas from coal. Lung cancer due to occupational exposure occurs after a latent period of 15-30 yr. (183 references)

- 65-208 PSYCHE--NERVOUS SYSTEM--NEOPLASTIC PROCESS: AN OLD PROBLEM WITH NEW INTEREST. PART III: CLINICAL OBSERVATIONS AND INVESTIGATION ON PSYCHOSOMATICS OF CANCER, PARTICULARLY BY THE PSYCHOANALYTICAL OR PSYCHOSOMATIC METHOD. (Ger.) Baltrusch, H.-J. F. (19 Babenend St., Oldenburg 29, Oldenburg, Germany), K. Austarheim and E. Baltrusch. Zschr. Psychosom. Med. 10(3):157-169, 1964.

A continuation of CRA 2(2):#165, and ibid., (8):#1422, 1964 is presented and consists of review on the role of personality and psychological and psychosomatic factors in the initiation and the course of neoplastic diseases. There seems to be a high degree of agreement in literature on the "cancer-prone" personality type. Comparisons of Rorschach findings by 7 independent authors are tabulated. (See also CRA 2(2):#376 and ibid., (6):#1182, 1964.) (No references)

- 65-209 CHRONIC TOBACCO INHALATION. (Ger.) Schmidt, O. P. (Sanatorium Trausnitz, Bad Reichenhall, Germany). Med. Klin. 59(28):1117-1123, 1964.

A review is presented of experimental and statistical studies on toxic effects of smoking, particularly with reference to lung cancer. (122 references)

- 65-210 CIGARETTES AND CANCER. (Ger.) Jantzen, G. (42 Jungmann St., Kiel, Germany). Prax. Pneumol. 18(6):404-414, 1964.

Mortality due to lung cancer in smokers and non-smokers is reviewed; a causal relationship to smoking is shown. Also discussed are the psychological motives for smoking, and the importance of public enlightenment on the risks of smoking, as well as measures to limit smoking, especially cigarette smoking (e.g., decrease taxes on cigars but increase those on cigarettes). (10 references)

- 65-211 CHROMOSOMAL ABNORMALITIES IN LEUKAEMIAS. (E.) Ruffie, J. (Dept. Hemat., Purpan Hosp., Toulouse, France), J. Ducos, R. Bierme, A. M. Salles-Mourlan, P. Colombies and J. C. Quilici. Lancet 2:589-590, 1964.

In a review and discussion of leukemia pts. whose blood cells showed a variety of chromosomal and karyotypic abnormalities, the authors noted that there appears to exist in leukemias, specific abnormalities of chromosome 21 and of the medium-sized groups of chromosomes. In addition, there may be other, non-specific chromosomal abnormalities, difficult to classify and possibly resulting from therapeutic measures. (See also CRA 1(12):#2063, 1964; and ibid., 3(1):#198, 1965.) (7 references)

- 65-212 CLINICAL AND HISTOPATHOLOGICAL STUDY OF CERTAIN CUTANEOUS TUMORS WITH A TENDENCY TO SPONTANEOUS INVOLUTION. (Rum.) Nicolau, S. G. (Dept. Derm.-Venerol., Minist. Health, Bucharest, Rumania) and L. Balus. Oncol. si Radiol. 2(5):413-427, 1963.

A number of cutaneous tumors are reviewed which, because of their benign evolution, are indicative of a defense reaction in the organism. In some cases (keratocanthoma, some multiple epitheliomas) a spontaneous involution up to complete disappearance occurred. Other forms developed very slowly (spinocellular and basocellular epithelioma, Malherbe calcified epithelioma) or showed partial regression (cellular nevi and especially Dubreuilh precancerous melanosis). It is suggested that a prevalent role in these involution processes is played by the pt's. immunobiological response. (See also CRA 2(2):#392, 1964) (38 references)

- 65-213 PHASES OF HUMAN CANCER RESEARCH. (FROM HEREDITY TO THE THEORY OF IMMUNITY AND THE VIRUS HYPOTHESIS.) (Ger.) Peller, S. Krebsarzt 19(3):173-193, 1964.

The history of cancer research is reviewed in the light of its relationship to heredity, immunity, virology and epidemiology. (93 references)

- 65-214 CANCER OF THE DIGESTIVE TRACT. (E.) Palmer, W. L. (U. Chicago Sch. Med., Ill.). Postgrad. Med. 36(1):11-18, 1964.

A review of the literature and the previous studies by the author with respect to the unexplained differences in the incidence of g.i. cancer in various parts of the world. It is stated that the frequency of gastric cancer has decreased dramatically in the U.S. and to some extent in other countries during the last 30 yr. Although diagnostic methods have improved, early diagnosis is difficult and the cancer metastasizes rapidly. (9 references)

- 65-215 THE CANCEROGENIC PROPERTIES OF SMOKING, AND ITS EFFECT ON THE HEART AND PERIPHERAL CIRCULATION. (Fin.) Konttinen, A. Duodecim 80(8):341-347, 1964.

In a paper devoted chiefly to the effects of smoking and nicotine on the cardiovascular system a brief review is presented of the experimental studies utilizing tobacco tar which support the association of bronchogenic cancer based statistical studies. (41 references)

- 65-216 BENZENE, BENZENE HOMOLOGUES AND MYELOID LEUKEMIA. (Ger.) Humperdinck, K. Krebsforsch. Krebsbekampf. 5:89-96, 1964.

The toxic effects of benzene, toluene and xylene

pecially their chronic effect on blood, are reviewed; included are 3 cases described in some detail. Benzene and its homologues are discussed the possible causes of leukemia. Clinical observations from the literature are presented. The leukemias found often in severe blood damage induced by benzene are often diagnosed as "aleukemic myeloid leukemia". There seems to be a problem in determining the borderline between leukoid hyperplasia and "aleukemic myeloid leukemia". Chronic myeloid leukemia is infrequent the number of those exposed to benzene is taken into consideration; it is, therefore, hard to evaluate the significance of benzene and other factors in the etiology of this form of leukemia. (references)

217 MUTATION SPECTRUM OF SOME ORGANO-SPECIFIC CARCINOGENIC SUBSTANCES. (Ger.)

Kel, H. A. (Inst. Radiobiol., U. Hamburg, Germany). Krebsforsch. Krebsbekampf. 5:138-142, 1964.

mutation spectrum of some organospecific carcinogens is discussed. The author's own work the mutagenic effect in E. coli B/r and sophila of N-nitroso-N-methylurethan, N-nitrosomorpholine and N-N-dinitrosopiperazine is reviewed. Spontaneous mutation and irradiation-induced mutations were used for comparison to chemically-induced mutations. In the study on bacteria, 30-40 various metabolic mutants were found, whereas only 2 mutant types were seen in sophila. (12 references)

218 CANCER AS A SOCIAL DISEASE. EPIDEMIOLOGY, PRECARCINOGENESIS, CARCINOGENESIS, PRECANCEROUS STATE, PREVENTION. (Sp.)

Curco, G. A. (Precancer Res. Ctr., Rome). Esp. Oncol. 10:153-168, 1964.

In a general discussion the author analyzes the geographic distribution and frequency of precancerous and cancerous conditions in relation to several regions of the continents, particular habits of the people, preferential sites and environmental conditions. The importance of applying various preventive measures against professional and other types of cancers where the

specific oncogenic stimulus is known is stressed. (No references)

65-219 GENERAL PATHOGENESIS OF LEUKEMIAS.

(Ger.) Georgii, A. (Inst. Path., U. Munich, Germany). Krebsforsch. Krebsbekampf. 5:9-29, 1964.

In a general review of the pathogenesis of leukemia (L), the following are discussed: radiation-induced L (following atom bomb exposure, in roentgenologists, following therapeutic or diagnostic irradiation and in experimental studies); L induced by carcinogens (benzene and derivatives, endogenous conditioned experimental L); virus-induced L in mice and humans; heredity as a factor in the development of L. (See also CRA 1(2):#143, 1963; ibid., 2(2):#169, 1964. (129 references)

65-220 CANCER IN CHILDHOOD AND ADOLESCENCE. GENERAL, STATISTICAL AND ETIOLOGICAL ASPECTS. (Ger.)

Ott, G. (Clin. Surg., U. Heidelberg, Germany). Deutsch. Med. J. 15(17): 565-570, 1964.

Among the general, statistical and etiologic aspects of cancer in children and adolescents, death due to cancer or leukemia in pts. under 30 yr. of age, cancer localization in children and adolescents, tumor histology in cancer pts. 0-30 yr. of age, and a classification of presarcomatoses are reviewed. Several case histories are also presented. The author finds that osseous sarcomas are now appearing more frequently and at progressively younger ages, so that the av. age at which the disease appears has been lowered within the last decade by 8 yr. (47 references)

65-221 UNUSUAL FORMS AND ASPECTS OF CANCER IN MAN. (E.) Roe, F. J. C. Nature (London) 203:356-357, 1964.

A brief review and discussion are presented on the survival of cancer pts., early diagnosis, treatment and transmission during pregnancy, incidence of multiple primary tumors, immunologic processes, and spontaneous regressions. (24 references)

See also abstract nos.: 235, 241, 257, 291, 322, 391, 394

PHYSICAL CARCINOGENESIS

- 65-222 THE STRONTIUM-90 CONTENT OF CANADIAN TOBACCO SAMPLES. (E.) Brown, J. R. (Dept. Physiol. Hygiene, U. Toronto, Canada) and A. A. Jarvis. Med. Serv. J. Canada 20(7):613-615, 1964.

The av. strontium-90 content of Canadian tobacco leaves from the 1961 crop per g of ash was 6.96 μC for the lamina and 12.40 μC for the midrib; the resp. calcium conc. was 0.108 g and 0.235 g. Although Sr^{90} is present in tobacco, it is not likely to enter the smoke, since its temperature of vaporization is higher than the estimated temperature of the core of a burning cigarette. Hence it is not apt to present any radiation hazard to the lungs.

- 65-223 THE LATENT INTERVAL FOR THYROID CANCER FOLLOWING IRRADIATION. (E.) Raventos, A. (Dept. Radiol., U. Pennsylvania Sch. Med., Philadelphia) and T. Winship. Radiology 83(3):501-508, 1964.

Among 528 thyroid cancer pts. whose histories included previous exposure to radiation, the mean latent interval (from first irradiation to histologic cancer diagnosis) was 12.5 yr., the median 10 yr.; the frequency distribution of the latent intervals approx. a log-normal function. The mean log interval is 10.9 yr. There were no significant sex differences. Age at irradiation was known in 497 pts., of whom 399 were children. The latent interval was significantly correlated with age at time of radiation exposure, being shortest for ages 3-6 and longest for ages 11-30. However, the limitations of the data are noted and discussed. The authors noted that the present study cannot add anything to the evidence that irradiation causes thyroid cancer nor to the estimation of a dose-response curve for that effect, but it should be useful in the analysis of any series of subjects exposed to radiation when it is desired to know the proportion of the eventual total number of thyroid cancers which might be expected to appear in any given period of follow-up or the relative probability of carcinogenesis for each one of a series of multiple exposures.

- 65-224 TRANSITION OF POLYCYTHEMIA VERA INTO OTHER MYELOPROLIFERATIVE SYNDROMES IN THE LIGHT OF THE OBSERVED CASES. (Pol.) Ławkowicz, W. (Clin. Hemat., Inst. Hemat., Warsaw, Poland), W. Czarnobielska and Z. Traczyk. Pol. Arch. Med. Wewnet. 34(7):961-965, 1964.

Three women (52-59 yr. old) with polycythemia vera developed osteomyelosclerosis within 4-14 yr. Two were treated by X-irradiation but 4 and 8 yr. later, showed further transition to acute myeloblastic leukemia; at autopsy one showed extensive leukemic infiltrations in all internal organs, meninges, and periosteum of almost all the bones.

The bone marrow showed osteosclerosis with myelofibrosis and leukemic metaplasia.

- 65-225 ROENTGEN THERAPY OF BONE TUMORS AND THE PROBLEM OF MALIGNANT DEGENERATION. (Ger.) Du Mesnil de Rochemont, R. (Dept. Radiol., U. Marburg/Lahn, Germany) and W. Schermuly. Radiologe 4(7):201-204, 1964.

Indications for X-ray therapy are discussed, stressing the fact that in cases of malignant degeneration the neoplastic process may be spontaneous or due to incomplete surgery, and not necessarily to be ascribed to the effects of radiation. There is no evidence that giant cell tumors undergo malignant degeneration more frequently with roentgen therapy than without it.

- 65-226 CHROMOSOMAL ABNORMALITIES FOURTEEN YEARS FOLLOWING TREATMENT OF THYROTOXICOSIS WITH I-131. (E., Abstract) Nofal, M. M. (Dept. Int. Med., U. Michigan Med. Ctr., Ann Arbor) A. M. Al-Saadi and W. H. Beierwaltes. Clin. Res. 12(2):276, 1964.

I-131 used in the treatment of hyperthyroidism (acute and chronic, for up to 14 yr.) produced an increased incidence of chromosomal abnormalities of WBC. In 9 pts. (16-49 yr.) with thyroid carcinoma, the admin. of I-131 (150-200 mC) was followed by chromosomal abnormalities of WBC which appeared shortly after treatment and were more frequent and more severe with the higher dose.

- 65-227 RENAL PELVIS CARCINOMA AFTER RETROGRADE PYELOGRAPHY WITH THOROTRAST. (Ger.) Hubmann, R. (Dept. Urol., U. Saarland, Homburg/Saar, Germany) and P. W. Hoer. Urologe 3(4):227-237, 1964.

Among 4 cases of thorotrastosis of the kidney 18-30 yr. after retrograde pyelography, 3 women (age 48-62 yr.) had developed squamous epithelium carcinoma after latent periods of 26, 28, and 30 yr. It is recommended that every kidney with marked incorporation of Thorotrast should be removed surgically whether symptomatic or not.

- 65-228 THOROTRAST GRANULOMAS. (E.) Barry, W. (Misericordia Hosp., Philadelphia, Pa.) and C. J. Rominger. Am. J. Roentgen. 92(3):584-590, 1964.

Two women, aged 73 and 54 yr. resp., developed granulomas of the neck at the inj. site of Thorotrast, which had been admin. for carotid arteriography 3 and 18 yr. earlier, resp. In each case, some of the contrast medium had extravasated.

229 THE APPEARANCE OF CARCINOMA AND SARCOMA IN RADIATION DERMATITIS. (It.) Lovo, F. (Nat. Inst. Stud. Cure Cancer, Milan, Italy) and N. Cascinelli. Tumori 50(3):233-237, 1964.

Case is reported of a woman who at age 22 yr. developed radiation dermatitis on her back 2 yr. after several chest X-ray examinations in the course of treatment for pulmonary tuberculosis. At age 48 yr. she developed a tumefaction at the site of the cutaneous lesion which became ulcerated. Histological examination revealed the presence of a spinocellular carcinoma and a spindle cell sarcoma. The two lesions were not adjacent.

230 TUMOR PRODUCTION IN RATS OF VARIOUS AGES BY MEANS OF WHOLE BODY X-IRRADIATION. (Ger.) Stutz, E. (Inst. Radiol., U. Freiburg i. Br., Germany). Krebsforsch. Krebsbekampf. 51-155, 1964.

CRA 2(3):#429; and ibid., (8):#1451, 1964.

231 DEMONSTRATION OF INDIVIDUAL SPECIFIC ANTIGENICITY IN UV-INDUCED MOUSE SARCOMAS. (Ger.) Pasternak, G. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin), A. Graffi and H. Horn. Acta Biol. Med. German. 13(2): 279-297, 1964.

After daily UV-irradiation, inbred strain XVII/Bl mice developed UVT14306 and UVT15264 sarcomas. After immunization, irradiated tumor tissue (0.2-0.5 ml of a 1:4 dilution of a cell suspension) was inj. s.c. at 14-day intervals. The effect of immunization was tested with fixed tumor cell suspensions admin. 3 days after the last inj. of

irradiated tumor tissue. After immunization with UVT14306 or UVT15264 and test dose of $2-5 \times 10^4$ tumor cells, 28/39 or 43/49 mice, resp., were resistant, as compared to 7/38 or 9/40, resp., in controls. In cross-experiments, mice resistant to UVT14306 sarcoma were tested for resistance against UVT15264 sarcoma and vice versa. After the inj. of UVT15264 (cell dose (CD) = 5×10^4) into UVT14306-sarcoma-resistant mice (CD = 1×10^5), 2/16 showed resistance as compared to 0/10 controls. After the inj. of UVT14306 (CD = 5×10^4) sarcoma into UVT15264-sarcoma-resistant mice (CD = 2×10^4 or 5×10^4), 4/32 or 0/19, resp., showed resistance as compared to 0/10 or 1/10, resp., in controls. Therefore, the mice showed no resistance toward the second tumor, and a cross-reaction between the 2 tumors could be excluded. (See also CRA 3(1):#35, 1965.)

65-232 MONTH OF ESTIMATED ONSET OF LEUKEMIA IN HIROSHIMA AND NAGASAKI ATOMIC BOMB SURVIVORS. (Jap. & E.) Nefzger, M. D. (Dept. Stat., Atomic Bomb Casualty Comm., Hiroshima, Japan), T. Hoshino, T. Itoga, A. Yamada and S. Toyoda. Hiroshima Igaku (J. Hiroshima Med. Assn.) 17(1):60-69, 1964.

The month of disease onset was recorded for 638 known leukemia pts. among the survivors of atomic bombing at Hiroshima and Nagasaki during 1946-1961. This showed a summer (August) excess of observed over expected numbers among those who were closest to the hypocenter, 0-1999 m; an autumn (November) deficiency was seen for the total group in both sexes, in both cities, and for both chronic and acute cases. No interpretation of these variations is offered.

See also abstract nos.: 205,207,217,262,277
280,326,357,387

CHEMICAL CARCINOGENESIS

- 65-233 INDUCTION OF PULMONARY AND UTERINE TUMORS IN RATS BY SUBCUTANEOUS INJECTIONS OF 4-NITROQUINOLINE 1-OXIDE. (E.) Mori, K. (Dept. Med. Biol., Showa U. Sch. Med., Tokyo, Japan). *Gann* 55(4):277-282, 1964.

Thirty Buffalo strain female rats (3 mo. old; wt. over 150 g) received 4-nitroquinoline 1-oxide (NQO), 0.25-0.5 mg/wk. (in olive oil + lecithin) to a total of 10 mg s.c., each time at a different site on the back. The animals were sacrificed when found in poor condition. Sarcomas appeared at the inj. site after 6 mo.; 1 or 2 sarcomas/rat were induced in 22/25 which survived more than 228 days. One to 10 pulmonary adenomas/rat (av. 2.9) developed in 22 rats; more adenomas occurred when the vehicle was olive oil + cholesterol. Three had squamous metaplasia, 2 had adenocarcinomas, and 1 had an epidermoid carcinoma. Uterine leiomyosarcomas with necrotic centers occurred in 3 rats, typical adenocarcinomas penetrating the uterine wall and infiltrating out of the parametrium occurred in the uteri of 2. No spontaneous uterine tumors have occurred in these rats for the past 16 yr. When 8 mg of NQO in olive oil alone was admin. s.c. to rats, pulmonary adenomas and cancers were induced at a high rate. It was concluded that the possibility of inducing tumors in different sites may depend on the composition of the solvent. (See also CRA 1(4):#624, 1963, *ibid.*, 2(2):#213, 1964 and the following abstract.)

- 65-234 FURTHER STUDIES ON THE HISTOGENESIS OF PULMONARY TUMORS IN MICE INDUCED BY 4-NITROQUINOLINE 1-OXIDE. (E.) Mori, K. (Dept. Med. Biol., Showa U. Sch. Med., Tokyo, Japan). *Gann* 55(4):315-323, 1964.

Thirty female Swiss mice (1-1.5 mo. old; wt. 15.5 g) received 4-nitroquinoline 1-oxide, 0.25 mg/wk. x10 s.c. (in olive oil + cholesterol), each time at a different site on the back. The animals were then observed for 1 yr.; 35% of control mice showed spontaneous pulmonary adenoma. Among the 96 tumors examined in the experimental group, 19 adenomas (19.8%) and 1 adenocarcinoma (1.0%) showed no relationship to the bronchus and arose from alveolar cells and sub-pleural adenoma, resp. Close relation with the bronchial terminals was demonstrated in 76 tumors (79.1%): 54 adenomas arising from epithelial cells where the terminal bronchioli pass into the alveolar ducts, 13 adenocarcinomas originating from adenomas of bronchioli, and 9 adenocarcinomas arising directly from the bronchial terminals. (See also CRA 1(4):#624, 1963, and the preceding abstract.)

- 65-235 NEWER STUDIES ON THE CARCINOGENIC ACTION OF QUINOLINE N-OXIDE DERIVATIVES. (E.) Nakahara, W. (Nat. Cancer Res. Ctr., Tokyo). *Arzneimittelforschung* 14(7):842-844, 1964.

The carcinogenic mechanism of 4-nitroquinoline N-oxide (NQO) is reviewed (21 references) and discussed. The author has confirmed the carcinogenicity of 4-hydroxyaminoquinoline N-oxide by s.c. inj. of its suspension in propylene glycol into mice; his unpublished data seem to show that this substance may be less active than NQO. The following compounds related to NQO were inj. s.c. to mice (0.25 mg x6, at 10-day intervals, as nearly as possible at the same site): 4-nitropyridine N-oxide; 4-nitroquinoline; quinoline N-oxide; 4-aminoquinoline N-oxide; 4-hydroxyquinoline N-oxide; 4-bromoquinoline N-oxide; 4-chloroquinoline N-oxide; 4,6-dinitroquinoline N-oxide; 4,6,8-trinitroquinoline N-oxide; 3-nitroquinoline N-oxide; 4-thioglycolylquinoline; and 9-nitroacridine N-oxide. They were all found to be non-carcinogenic when observed for 300 days.

- 65-236 COMPARATIVE OBSERVATIONS OF EXPERIMENTALLY INDUCED MOUSE CERVICAL-VAGINAL TUMORS AND HUMAN CERVICAL CARCINOMA. (Jap., Abstract) Hosokawa, T. (Jikei Sch. Med., Tokyo, Japan), M. Iwata, N. Tsutsumi and M. Aoyagi. *Nippon Sanka Fujinka Gakkai Zasshi* (J. Jap. Obstet. Gynec. Soc.) 16(2):85, 1964.

Topical application of 1% 3,4-benzpyrene to the cervix and vagina of 300 C3H mice (no further details) led to tumors in approx. 20%. As compared with naturally occurring human cervical carcinoma, these tumors developed more frequently in the vaginal wall rather than in the cervix, were nodular or polypoid in type rather than ulcerative or invasive, caused less destruction and infiltration into the adjacent tissues, and showed no metastatic tendency. Treated mice survived almost as long as controls. Histologically, the majority of these tumors were similar to differentiated squamous cell carcinoma, although there were considerable amounts of transitional stages from normal epithelium to atypical epithelium. The atypical changes in these tumors resembled those seen in human carcinoma.

- 65-237 TRANSFER OF LEUKEMIA IN RATS BY PERIPHERAL BLOOD. (Ger.) Ivankovic, S. (Dept. Surg., U. Freiburg i. Br., Germany). *Arzneimittelforschung* 14(7):836-837, 1964.

Six adult BD VI strain rats received various p.o. doses of p-nitroso-methylamino-azobenzene and 1/6, which was treated at the highest dosage (1000 mg/kg), developed severe leukemia after 425 days. No leukemia occurred among 3000 BD VI controls observed for 2 yr. Blood removed from the left heart chamber of this leukemic rat was inj. i.p. to 10 young BD VI rats, and in 12-15 days, 7/10 developed severe leukosarcomatosis with pathologic cells in the peripheral blood (200,000-300,000/mm³). Microscopic infiltrations of lymphoblast-like cells were found in the liver, kidney, bone marrow, brain,

, and even heart muscle. Five BD VI rats were implanted s.c. with pieces of the enlarged thymus lymph nodes of the leukemic animals; all developed s.c. tumors accompanied by leukemia after about 15 days. Pathologic cells in peripheral blood were found already on day 10-12 after transplantation.

238 HISTOCHEMISTRY OF EXPERIMENTALLY INDUCED FIBROSARCOMA IN RAT SUBMAXILLARY GLAND. (E.) Chauncey, H. H. (Dept. Dent. Sci., Boston U. Sch. Dent. Med., Boston, Mass.), Shklar and G. Quintarelli. Oral Surg. 18(3):9-398, 1964.

The submaxillary glands of 4-month-old albino rats, inj. with 3,4-benzpyrene (BP; 0.3 mg every 2 days for 1-12 doses) showed, after 2-24 wk., histologic and histochemical responses which depended on the number of BP inj. and on the subsequent duration of their maintenance before sacrifice. In animals given 1 dose, the submaxillary glands were normal when sacrificed 2-24 wk. later. After 2 doses, all glands were normal after 2 or 4 wk., but 1 of 2 kept for 24 wk. was enlarged. Of 3 doses given 3 or 4 doses and kept for 6 or 8 wk. thereafter, 3/4 and 1/4, resp., showed enlarged glands. Of those kept 24 wk. after 3 doses, 2/4 showed early fibrosarcomas. Of those given 12 doses, after 24 wk., 7/9 survivors showed firm glandular enlargements with typical fibrosarcomas. In controls were normal. Stromal connective tissue cells were more sensitive to the carcinogen than was adjacent glandular epithelium. Acid phosphatase activity in the gland decreased as the lesions progressed toward malignancy. At the same time, β -D-galactosidase, nonspecific esterase and aminopeptidase activities were notably increased. All 3 enzymes were localized in the cytoplasm of the fibroblasts; the last 2 were also in the fibers themselves.

239 ACUTE LIVER INJURY IN DUCKLINGS AS A RESULT OF AFLATOXIN POISONING. (E.) Butler, W. H. (Dept. Morbid Anat., U. London Sch. Med. Hosp.). J. Path. Bact. 88(1):189-196, 1964.

Day-old Khaki Campbell ducklings given single doses of aflatoxin (AF; 15 μ g p.o.) showed in 2 days biliary proliferation and fatty degeneration of the liver parenchyma. After 3 days, the lesions regressed. Larger doses of AF (25 μ g in 24 hr. or 50 or 100 μ g in 24 hr.) were lethal. The lesions in ducklings were comparable to those seen after a single dose of dimethylnitrosamine and cycasin but not to those of other hepatotoxic agents such as CCl₄, ethionine and thioacetamide. (See also CRA 2(2):#241; *ibid.*, (7):#1260, 1964.)

240 AZOPEPTIDES OBTAINED BY ALKALINE HYDROLYSIS OF LIVER PROTEINS FROM RATS TREATED WITH 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE.

(E.) Prodi, G. (Inst. Gen. Path., U. Bologna, Italy). Ital. J. Biochem. 12(3):199-207, 1963.

Proteins were extracted by alkaline hydrolysis from the livers of rats fed 3'-methyl-4-dimethylaminoazobenzene (0.06%) in a normal diet for 15-25 days; the amino acids were identified by electrophoresis and paper chromatography. Data on the 3 azopeptides isolated indicated that the azo dye interacted with a specific site of the protein. The role of such interaction in carcinogenesis is not yet determined.

65-241 CANCER OF THE BLADDER. BIOCHEMICAL FACTORS IN ITS ETIOLOGY. (E.) Kerr, W. K. (Dept. Surg., U. Toronto, Canada), M. Barkin and Z. Menczyk. Canad. J. Surg. 7(4):414-419, 1964.

This review (36 references) covers briefly the researches on bladder carcinogenesis, beginning with the industrial (occupational) causes, through the demonstration that the immediate carcinogen was not the aromatic amines but their ortho-aminophenol derivatives, to the implication of tryptophan metabolites in spontaneous bladder carcinogenesis. The authors have observed (unpublished) that the normothermic perfused isolated dog's kidney was capable of metabolizing tryptophan along its carcinogenic pathway as was an isolated human bladder containing tumor, and it was concluded that the urinary tract was a significant source of kynurenine, a precursor of the carcinogenic aminophenols. (See also CRA 1(4):#678, and *ibid.*, (8):#1497, 1963.)

65-242 RESULTS OF DISTILLATION OF ADMIXTURES OF TOBACCO. PART I: GLYCOLS. (Ger.) Kröller, E. (Nat. Inst. Health, Berlin). Deutsch. Lebensmittelrunds. 60(3):235-239, 1964.

Besides glycols, the distillation condensates of tobacco contained aromatic hydrocarbons including the carcinogenic 7,12- and 9,10-dimethyl-1,2-benzanthracene, and fluoranthene, and 3,4-benzpyrene besides other pyrene derivatives, coronene and phenanthrene or 2-methylphenanthrene, and possibly naphthacene, pentacene, and benzfluorene, as well as anthraquinones. The amount of 3,4-benzpyrene obtained by pyrolysis of 100 g of a glycol increases in the following order: diethylene-, propylene-, butylene-, and triethylene glycol. (See also CRA 2(8):#1468, 1964.)

65-243 POSSIBILITIES OF INTERFERENCE OF SENSITIZING AGENTS IN CHEMISTRY AND BIOLOGY OF RADIATION. PART V: CARCINOGENICITY OF CHOLESTRIN, CHOLESTRIN-5-HYDROXYPEROXIDE AND CHOLESTRIN-7-HYDROXYPEROXIDE. (Ger.) Koch, R. (Inst. Radiol., U. Freiburg i. Br., Germany), G. O. Schenck and O.-A. Neumüller. Strahlentherapie 124(4):626-632, 1964.

A more detailed account of the paper abstracted as CRA 1(5):#889, 1963. The authors believe that cholesterol-5-hydroperoxide has no true carcinogenic, but a cocarcinogenic effect. (See also CRA 2(3):#455, 1964.)

65-244 RESISTANCE AGAINST CARCINOMAS OF THE SKIN INDUCED BY DIMETHYLBENZANTHRACENE (DMBA) IN MICE OF THE STRAIN XVII/Bln. (E.) Pasternak, G. (Inst. Exp. Cancer Res., German Acad. Sci., Berlin-Buch), A. Graffi, F. Hoffmann and K.-H. Horn. *Nature (London)* 203:307-308, 1964.

Female XVII mice were immunized by 2 s.c. inj. (at 14-day intervals) of X-irradiated tumor suspensions of 2 dimethylbenzanthracene (DMBA; total 120 γ)-induced keratinizing squamous epithelial carcinomas (DMBA 592 and DMBA 788) or by the inj. of living (DMBA 592) cells (1.6×10^5); the challenge was inj. in the contralateral s.c. region 1 day after the last immunization inj. All the animals immunized with DMBA 592 were resistant against this tumor. A weaker resistance occurred with DMBA 788, as shown by 13/30, 11/30 and 5/30 resistant animals at 25, 32 and 39 days, resp., after challenge. The results of 65%, 60% and 48% resistant animals 25, 32 and 39 days, resp., after challenge in the combined test group as compared with 3% in the controls were statistically significant. It is concluded that tumor-specific antigenicity is a characteristic of carcinogen-induced carcinomas as well as of carcinogen-induced sarcomas previously reported by others.

65-245 MOLECULAR STRUCTURE OF AROMATICS RELATED TO THEIR ABILITY TO INDUCE ADRENAL PROTECTION. (E.) Huggins, C. (Ben May Lab. Cancer Res., U. Chicago, Ill.) and R. Fukunishi. *Arzneimittelforschung* 14(7): 834-836, 1964.

Compounds to be evaluated as adrenal protectors were admin. by gastric intubation of Sprague-Dawley female rats (av. wt. 151 g) 24 hr. before a single i.v. inj. of 7,12-dimethylbenz(a)anthracene (DMBA; 5 mg). The rats were decapitated 3 days later, and their adrenals studied. Among 72 compounds evaluated at many dose levels, 51 induced adrenal protection (prevented adrenal hemorrhage). The duration of the protected state was limited (e.g., lasting 2-3 days). Thirty-three compounds induced protection of the adrenal at a dose of 2.5 mg or less and were classified as highly efficient protectors. These compounds were all aromatics composed of 4 or 5 rings, whereas those consisting of 2 or 3 rings were less effective. The ability of a compound to induce protection against the adrenocorticolytic effect of DMBA depended on its molecular geometry and ability to participate in charge transfer complexes. (See also CRA 1(12):#2065, *ibid.*, 2(2):#222; and *ibid.*, (7):#1302, 1964.)

65-246 FACTORS INFLUENCING THE INTERACTION OF POLYCYCLIC HYDROCARBONS AND DEOXY-RIBONUCLEIC ACID. (E.) Boyland, E. (Chester Beatty Res. Inst., London, S.W.3), B. Green and S.-L. Liu. *Biochim. Biophys. Acta* 87(4):653-663, 1964.

The interaction of pyrene or benzpyrene with DNA, rendering these hydrocarbons more soluble in aqueous DNA soln. than in water, was found to be affected by various ions. The extent of solubilization of hydrocarbon in aqueous DNA soln. was reduced in Mg^{++} or Ca^{++} (1 mM) or Na^+ or K^+ (10 mM). Various agents including Mg^{++} , Ca^{++} , cadaverine, urea, heat and small proportions of ethanol or dimethylsulfoxide were able to release the hydrocarbon from the DNA in 1 mM NaCl. The authors noted that the data were interpreted in terms of the intercalation theory.

65-247 INHIBITION BY A CARCINOGENIC HYDRO-CARBON OF INCORPORATION OF TRITIATED CYTIDINE INTO MOUSE EPIDERMAL CELLS. (E.) Sinclair, N. R. (Dept. Biochem., Dalhousie U., Halifax, Canada) and J. A. McCarter. *Nature (London)* 203:521-523, 1964.

7,12-Dimethylbenz(a)anthracene (DMBA; 0.15 ml of a 0.5% soln. in acetone) was applied to a shaved area (2 cm²) on the back of mice derived from the CFW strain. The mice were sacrificed at various intervals, and the treated and control skin samples incubated in Tyrode's medium containing H³-cytidine. Under continuously labeled conditions, the control skin area took up more H³-cytidine than the treated area. When the skin was transferred to non-radioactive cytidine after 1 hr., the percentage reduction in grain count in the DMBA-treated skin (compared with the control) was similar to that obtained under the continuous labeling condition. The results indicate that there was a reduction in incorporation of H³-cytidine into the metabolically stable RNA.

65-248 THE STUDY OF CHEMICAL SUBSTANCES FOR POSSIBLE CARCINOGENIC ACTION. (E.) Della Porta, G. *Excerpta Med. (Ser. LXXV)* 3:29-40, 1964.

Practical suggestions for the minimum requirements for testing of chemical substances for carcinogenic action are presented. It is believed 2 animal species are sufficient. If inbred lines are used, at least 2 strains should be employed. Skin painting experiments are mandatory in the testing of cosmetics. With s.c. inj., groups of 50 male and female 5-week-old mice may be used at a definitely toxic dose admin. for 10-20 wk. and non-toxic doses should be admin. for 50 wk. Controls should number 100 males and 100 females. Baby mice may be used as an additional experimental group. Observation should last till 80-120 wk. of age. Also, the reactivity of the strain

several known carcinogens of different chemical classes should be known. For the testing of food additives and pesticides, mice should be treated enterally (on above schedule), and rats (age, 30 of each sex) by feeding or by stomach tube. Rats treated at a definitely toxic level should be observed until age 100-120 wk. Baby mice and rats may also be used; baby rats should be treated by stomach tube. The above are basic requirements for detection of strong carcinogens; more elaborate tests may be necessary to detect weak carcinogen. The significance of the initiation-promotion mechanism of carcinogenesis is discussed.

249 COMPARATIVE CUTANEOUS CARCINOGENESIS IN THE RAT. DIFFERENTIAL RESPONSE TO THE APPLICATION OF ANTHRAMINE, METHYLCHOLANTHRENE, AND DIMETHYLBENZANTHRACENE. (E.) Zackheim, H. S. *Arch. Derm.*, Wayne State U. Coll. Med., Detroit). *Arch. Derm.* (Basel) 17(3-4):236-246, 1964.

Methylcholanthrene (MC; 0.18 ml of 0.3% soln. wk. to 42 rats) and anthramine (A; 0.18 ml of soln. 2x/wk. to 84 rats) were applied for 300 days with a pipette to the unshaved mid-back region of rats of both sexes of the Fisher Holtzman strains and various colored hooded rats 3-6 mo. old. The results were compared to those for dimethylbenzanthracene (DMBA) which were reported previously (see CRA 2(4):#678, 1964). No significant differential response to these carcinogens as to sex or strain of rat, or duration of treatment, was found. Results after treatment with A were: 73/84 (87%) basal cell carcinoma; 30/84 (36%) squamous cell carcinoma; 8/84 (9%) fibrosarcoma; 8/84 (9%) sebaceous gland cell epithelioma; 10/84 (12%) sebaceous gland tumor; and 4/84 (5%) acoustic sebaceous tumor. Results of treatment with MC were, resp.: 26%, 0, 26%, 12%, and 0. Thus A and MC differed from DMBA since the predominant neoplasm with the latter was squamous cell carcinoma. Details of fluorescence studies and histology are presented.

250 BENZO(A)PYRENE AND OTHER POLYNUCLEAR HYDROCARBONS IN CHARCOAL-BROILED MEAT. (E.) Lijinsky, W. (Div. Oncol., U. Chicago Sch. Med., Ill.) and P. Shubik. *Science* 145(2):53-55, 1964.

To investigate the possible production of carcinogenic polynuclear hydrocarbons in the charcoal broiling of food, 15 steaks (1.1 kg each) were cooked 15 cm away from wood charcoal ignited with purified isooctane. The polynuclear compounds were extracted, separated by chromatography and identified spectrometrically. The hydrocarbons found and their conc. in µg/kg of steak were as follows: fluoranthene 20; pyrene 18; anthracene 11; 3,4-benzopyrene 8; benzo(e)pyrene 1; 1,2-benzanthracene 4.5; anthracene 4.5; benzo(a,h,i)perylene 4.5; alkyl-benzanthracene 2.4;

coronene 2.3; anthanthrene 2; perylene 2; chrysene 1.4; benzo(b)chrysene 0.5; 1,2,5,6-dibenzanthracene 0.2. The hydrocarbons present are similar to those found in other pyrolysis products, except that no nitrogen-containing polynuclear compounds were detected.

65-251 STUDIES ON THE INCIDENCE OF EXPERIMENTAL BLADDER TUMOR BY 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE-N-OXIDE, AND ON THE CELLULAR CHARACTERISTICS OF ITS TUMOR BY TISSUE CULTURE. I. THE STUDY ON THE INCIDENCE OF EXPERIMENTAL BLADDER TUMOR INDUCED BY 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE-N-OXIDE. (Jap.) Okajima, E. (Dept. Path., Nara Coll. Med., Japan). *Nara Igaku Zasshi* (J. Nara Med. Assn.) 15(1): 1-20, 1964.

Wistar (Daikoku strain) rats received single inj. of 3 mg (0.1 ml) of suspensions of 20-methylcholanthrene (MC) or 4-nitroquinoline-N-oxide (NQO) in 2% methocel into the submucosal connective tissue of the bladder. After 35 wk., the 9 males and 8 females in the MC group showed the following bladder tumors: 12 papilloma, 5 squamous metaplasia, 1 papillomatosis with Grade 1 squamous cell carcinoma, and 1 fibrosarcoma. The 13 males and 8 females in the NQO group showed 14 papilloma, 5 Grade 1 carcinoma, 5 squamous metaplasia, 1 fibrosarcoma. Tumor incidence was higher in males than in females. A higher incidence of papillomatosis was seen with NQO than with MC. (See also the following abstract.)

65-252 STUDIES ON THE INCIDENCE OF EXPERIMENTAL BLADDER TUMOR BY 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE-N-OXIDE, AND ON THE CELLULAR CHARACTERISTICS OF ITS TUMOR BY TISSUE CULTURE. II. THE STUDY ON THE TISSUE CULTURE OF EXPERIMENTAL BLADDER TUMOR INDUCED BY 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE-N-OXIDE. (Jap.) Okajima, E. (Dept. Path., Nara Coll. Med., Japan). *Nara Igaku Zasshi* (J. Nara Med. Assn.) 15(1): 21-58, 1964.

One papilloma induced in the bladder of Wistar Daikoku strain rats by 20-methylcholanthrene and 3 papillomas and 2 cases of transitional cell carcinoma induced similarly by 4-nitroquinoline-N-oxide (see preceding abstract) were observed to grow in plasma clot cultures as did normal rat bladder epithelium. The latent period, i.e., from the time of starting culture to the time when round cells began to be mobilized and epithelial cells began to proliferate, ranged from 19 to 24 hr. with normal cells, in comparison with 12-24 hr. with tumor cells. Tumor cells showed pronounced anisocytosis, polynucleosis, increased numbers of nucleoli and irregularly spread cytoplasmic granules, as compared with normal cells. Serial cell transfer by the monolayer culture method was possible with transitional cell carcinoma cells, but not with normal nor papilloma cells. In the plasma clot culture, both normal and tumor cells formed

an epithelial cell sheet in the course of proliferation. No abnormal cell divisions were observed with both normal and tumor cells. Both normal and tumor epithelial cells showed spontaneous amoeba-like movement. The epithelial cell sheet was observed to produce a wave-like movement.

- 65-253 EXPERIMENTAL STUDY OF GASTRIC ADENOCARCINOMA IN RATS. (Jap.) Kanazawa, K. (Dept. Surg., Tokyo U. Sch. Med., Japan). Tokyo Igaku Zasshi (Tokyo J. Med. Sci.) 72(1):19-48, 1964.

In an attempt to induce adenocarcinoma in Daikoku Wistar rats (2 mo. old; wt. 80-110 g), a 20-methylcholanthrene (MC) agar pellet (40 γ) was either inserted submucosally into the glandular stomach (240 rats) or deposited in a gastric pouch in the anterior and posterior walls of the glandular stomach (240 rats), followed 1 mo. later by 5 weekly s.c. inj. of 4-nitroquinoline N-oxide (NQO; 1 mg in olive oil, 5 mg total). On examination of the gastric wall, no distinct malignant growth developed until the end of wk. 89 following MC implantation. In 48/143 animals, various types of sarcomas (fibro-, myo-, reticulum cell, myxo-, and lipo-) developed at the s.c. inj. site during wk. 36-89. The development of sarcoma in 1/5 receiving NQO only indicates that there was no statistically significant difference in the sarcoma incidence in those receiving NQO alone and in those receiving both MC and NQO. A MC pellet inserted into the hepatic parenchyma of rats induced fibrosarcoma in 2/250 following the formation of fibrous capsules which developed around the pellets.

- 65-254 STUDIES OF THE EFFECT OF ANDROGEN ON THE GENESIS OF CARCINOMA OF THE CERVIX. (Jap.) Koga, Y. (Dept. Obstet. Gynec., Kyushu U. Sch. Med., Japan), Y. Okamura, Y. Imamura and A. Tanaka. Hormon To Rinsho (Clin. Endocr.) 12(8):585-590, 1964.

Measurement of urinary 17-KS during gestation in a total of 12 Oriental pregnant females who showed various proliferative and atypical changes in the tissues of the uterine cervix revealed an increased 17-KS excretion (av. 8.21 mg/day) as compared with normal pregnant females (av. 6.43 mg/day), indicating an increased androgen activity as well as an inhibition of glucuronide production. In an attempt to elucidate the effect of exogenous androgen on the genesis of experimental tumor production, 0.05 ml of 0.3% 3,4-benzpyrene in acetone (BP), daily for 5 wk., was applied topically to the uterine cervix of a total of 90 virgin ddN female mice (2+ mo.), with or without the concurrent s.c. admin. of testosterone propionate (TP), 45 or 90 γ /wk. and with or without unilateral or bilateral oophorectomy (OOX). Those receiving androgen failed to develop carcinoma, but however atrophic changes in bilaterally OOX mice occurred. Carcinoma developed in

those which did not receive androgen, particularly in bilaterally OOX mice, in unilaterally OOX mice, and in non-OOX mice (in this order of frequency). Androgen, when given without BP, caused proliferative changes in the mucous epithelium in non-OOX mice, and keratinization, and basal cell proliferation in OOX mice. The authors concluded on the basis of this experiment that androgen (TP) accelerated the proliferation of basal cells in the squamous epithelium of the uterine cervix, but inhibited the transformation of the tissue to infiltrative carcinoma.

- 65-255 THE IMPORTANCE OF CARCINOGEN DEPOSITION IN LUNG TISSUE FOR CANCER INDUCTION. (Rus.) Shabad, L. M. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow), L. N. Pylev and T. S. Kolesnichenko. Vop. Onkol. 10(6):65-72, 1964.

Random bred rats of both sexes (about age 3 mo.) were admin. 3,4-benzpyrene (BP; intratracheally, 5 mg/dose x 1-3 at monthly intervals) in the following combinations: BP + India ink (IN; 0.5 mg) + colloidal suspension (CS; salts + caseine; 0.2 ml); BP + CS; BP + IN + saline (S; 0.2 ml); BP + S. After each admin. 3 rats from each group were sacrificed at 1-30-day intervals and the amount of BP in lung tissue was determined by chromatography and spectrophotometry. In the first 24 hr., regardless of the combination, approx. 50% of BP remained in the lung tissue. In later periods the greatest amount of retained BP was observed when the agent was admin. with IN or CS, and the least when admin. with S. After repeated admin. with CS no retention was evident, but retention increased considerably when admin. with IN or CS. Repeated admin. with IN alone or CS alone did not result in any significant accumulation of BP in the lungs. It follows, from the results obtained, that previous unsuccessful attempts to induce pulmonary cancer were due to rapid excretion (elimination) of the carcinogen from the organism in absence of some kinds of adsorbents. The use of colloidal suspension (salt + caseine) or IN in the present experiments aided the retention of BP. (See also CRA 1(1):#10; and ibid., (2):#172, 1963.)

- 65-256 IMPORTANCE OF THE DEPOSITION OF CARCINOGENS FOR CANCER INDUCTION IN LUNG TISSUE. (E.) Shabad, L. M. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow), L. N. Pylev and T. S. Kolesnichenko. J. Nat. Cancer Inst. 33(1):135-141, 1964.

See CRA 3(2):#255, 1965.

- 65-257 THE PROPERTIES IN THE LABORATORY OF KNOWN CARCINOGENS. (E.) Walpole, A. L. Excerpta Med. (Ser. LXXV) 3:15-27, 1964.

A discussion is presented of variables involved in carcinogenesis with reference to the effect of

species, strain and sex of the experimental animal upon tumor take and tumor site, qualitative and quantitative differences according to the route of admin., and the relationships between dose and effect (including duration of the latent period). Proposed methods of testing for carcinogenic activity are critically reviewed (42 references). It is concluded that any substance known to produce continued hyperplasia of any organ of the experimental animal should be suspected of eventual carcinogenesis.

- 5-258 DETERMINATION OF THE AFLATOXINS. (E.) Nabney, J. (Tropical Prod. Inst., London) and B. F. Nesbitt. Nature (London) 203: 62, 1964.

A new method for determining the aflatoxins is described, and involves chemical extraction of groundnut meal with light petroleum, methanol, and chloroform followed by viewing of the chromatoplate under UV light. The aflatoxin B₁ content of the meal was 10.2 ± 0.19 p.p.m.

- 5-259 THE REPLICATION TIME AND PATTERN OF CARCINOGEN-INDUCED HEPATOMA CELLS. (E.) Post, J. (Goldwater Mem. Hosp., New York, N. Y.) and J. Hoffman. J. Cell. Biol. 22(2): 341-350, 1964.

A more detailed report of the article previously abstracted as CRA 2(7):#1295, 1964.

- 5-260 ELECTRON MICROSCOPIC STUDIES ON THE EXPERIMENTAL LUNG TUMOR IN MOUSE. (Jap.) Hayashi, N. (Dept. Path., Kobe Coll. Med., Japan). Kobe Ika Daigaku Kiyo (Bull. Kobe Med. Coll.) 25(1-4):121-140, 1963.

Administration of 1 mg 20-methylcholanthrene + 1 mg carbon black in olive oil into the bronchi or into the mesenchyma of the lung of NA₂ male mice (15 g) induced multiple nodular tumors after 100-200 days. The smooth, greyish white tumors were mostly benign papillary adenomas. Some of the mice which received the agents in the mesenchyma developed fibrosarcoma. The cells possessed osmiophilic inclusions, which are usually characteristically present in large alveolar epithelial cells. Unlike the latter cells, the papillary adenoma cells contained markedly atypical mitochondria, atypical osmiophilic inclusions, well-developed Golgi complex, small indistinct endoplasmic reticulum, and an increase of smooth-surfaced endoplasmic reticulum. The fibrosarcomas consisted of spindle-shaped tumor cells with little cytoplasm. The atypical changes and cell divisions were pronounced.

- 5-261 EXPERIMENTAL BRAIN TUMORS. (Jap.) Nishikawa, K. (Dept. Neurol., Keio U.

Sch. Med., Japan). Shinkei Kenkyu No Shimpo (Rec. Adv. Res. Nerv. Syst.). 7(2):37-60, 1963.

Implantation of methylcholanthrene pellets (0.5 mm³) into the brain parenchyma of a total of 528 mice (age 3-4 mo., male and female) of 8 strains (including DBA, C3H, NC, C57, black, dd, CFW, CF) induced brain tumors in 45 mice after 111-448 days. The tumors included 16 gliomas (medulloblastoma, glioblastoma, astrocytoma, oligodendroglioma, ependymoblastoma, and others), 7 mixed glioma and sarcomas, 21 sarcomas, and 1 carcinoma. Many of the tumors demonstrated various atypical forms, making classification difficult. In general, brain tumors were induced more frequently in colored strains of mice rather than in white mice. Transplantation of these brain tumors was more frequently successful when it was done within the same strain. Subcutaneous transplantation of meningiosarcoma caused diffusion and increased atypical changes, while its intracerebral transplantation gave rise to a marked proliferation of glial tissue.

- 65-262 PHOTODYNAMIC TOXICITY OF POLYCYCLIC AROMATIC HYDROCARBONS IN TISSUE CULTURE. (E.) Morimura, Y. (Dept. Path., Osaka U., Japan), P. Kotin and H. L. Falk. Cancer Res. 24(7): 1249-1259, 1964.

Tissue cultures of HeLa, FL (amnion) and M-5 (human embryonic skin) cells, when exposed first to various conc. of 3,4-benzpyrene (BP) for 20 min., then to UV irradiation (about 365 mμ wavelength) for from 0.5 second to 30 min. and post-incubated for 20 hr., showed a spectrum of photodynamic effects. The resulting biological response was dependent on the total energy absorbed by the BP incorporated into the cells. For all 3 tissues, the response was most sensitive at the highest conc. of BP (5 μg/ml), which required only 0.5 to 2 seconds of UV to produce temporary interference with mitosis; interphase death occurred at from 2 to 20 seconds of UV, while 20 to 40 seconds caused instant death, M-5 was the most sensitive tissue. Smaller conc. of BP (1.0 and 0.1 μg/ml) sharply increased the UV exposure time required to produce each response. With no BP, prolonged UV exposure brought mitotic interference and gradual interphase death. Exposure to BP at 5 μg/ml and to ordinary fluorescent light required similar prolonged exposures. Other polycyclic hydrocarbons similarly tested on HeLa cells were (in descending order of absorbency and phototoxic effect): fluoranthene, anthracene, 1,2-benzanthracene, benzo(ghi)perylene, benz(k)-fluoranthene, perylene, anthanthrene. On the basis of energy absorption, the carcinogenic and non-carcinogenic polycyclic hydrocarbons showed no difference in photodynamic toxicity. The findings show that photodynamic toxicity is non-specific and cannot be directly related to carcinogenesis.

- 65-263 BIOCHEMICAL STUDIES ON THE MALIGNANT TUMORS OF SKIN. (Jap.) Nohara, N. (Dept. Derm., Okayama U. Sch. Med., Japan). Hifu To Hinyo (Derm. Urol.) 26(2):159-177, 1964.

Biochemical studies are reported on human and experimental tumors. Human skin tumors consisted of 10 cases of prickle cell carcinoma, 8 basal cell carcinoma, 2 Paget's disease, 1 each of malignant melanoma, skin sarcoma, and skin leukemia obtained from Oriental adults aged 28-85 yr. (14 males and 9 females). In human skin tumors, av. deviations (+ = increase, - = decrease) expressed in percentage (normal skin = 0%) were: total protein, +72.3%; albumin, +16.4%; globulin, +100.8%, α -globulin, +112.5%; β -globulin, +116.7%; γ -globulin, +74.5%; glucose, +0.33%; glycogen, +65.90%; blood glucose, +41.4% (before excision of tumor) and -5.97% (after excision of tumor); water, +4.92%; sodium, 27.6%; potassium, +75.03%; calcium, +6.19%; magnesium, 20.39%; vitamin B₆, +88.9%; blood vitamin B₆, -75.0% (before excision) and -63.2% (after excision); niacin, + (percentage not mentioned); vitamin C, +138.6%; and blood vitamin C, -52.34%. In 200 young ddS mice (av. wt., 23.5 g), prickle cell carcinoma was induced in 98/123 (79.7%) survivors approx. 4 mo. following twice weekly topical application of 0.6% 20-methylcholanthrene (in benzene) to the back. Av. deviations expressed in percentage were total protein, +155.4%; albumin, +117.0%; globulin, +169.8%; α -globulin, +162.2%; β -globulin, +195.6%; γ -globulin, +148.8%; glucose, -1.33%; glycogen, +18.18%; blood glucose, -19.15%; water, +12.5%; sodium, -8.53%; potassium, +132.2%; calcium, +105.4%; magnesium, +56.7%; iron, +38.2%; copper, +90.7%; vitamin B₆, +20.1%; blood vitamin B₆, -27.9%; niacin, +35.7%; vitamin C, -8.19% and blood vitamin C, -52.86%. The normal skin used was from tumor-bearing subjects or mice except for blood glucose, vitamin B₆, vitamin C and niacin in which cases comparisons were made with healthy non-tumor-bearing subjects or mice.

- 65-264 AN ELECTRON AND FLUORESCENCE MICROSCOPE STUDY OF THE DEVELOPMENT OF A MELANOTIC TUMOR INDUCED BY 7,12-DIMETHYLBENZ(A) ANTHRACENE IN THE SYRIAN GOLDEN HAMSTER. (E.), Ph.D. Thesis, Order No. 64-7987, Univ. Microfilms, Inc., Ann Arbor, Mich.) Bassel, A. I. R. (U. Texas, Houston). Diss. Abstr. 25(1):703, 1964.

Cutaneous application of 9,10-dimethyl-1,2-benzanthracene (DMBA) induced changes in hamster skin which included the appearance of large intercellular spaces in the basal layer of the epidermis, swelling of the mitochondria of both epidermal cells, and the appearance of ribosome-containing inclusions in the cisternae and vesicles of the endoplasmic reticulum in some epidermal and dermal cells. Fluorescence microscopy showed that DMBA was located in the keratinized layer of the epidermis, the sebaceous glands, and the hairs and hair follicles 2 hr. after

application of the carcinogen. Descriptions of perifollicular aggregates of melanocytes in pre-neoplastic melanotic lesions and of the structure of DMBA-induced melanotic tumors and melanin granule development in the tumors are given, and the possibility of interference in protein synthesis by DMBA is discussed.

- 65-265 ON THE REPORTED SEDIMENTATION OF POLYCYCLIC HYDROCARBONS FROM AQUEOUS SOLUTIONS OF DNA. (E.) Boyland, E. (Chester Beatty Res. Inst., London, S.W.3) and B. Green. J. Molec. Biol. 9(2):589-597, 1964.

When aqueous soln. of DNA in 3,4-benzpyrene (BP) or pyrene (P) were centrifuged in tubes of cellulose acetate or polyethylene/propylene, the BP or P was removed as reported by Giovanella *et al.* (1964) (see CRA 2(4):#691, 1964); it was therefore denied that solubilization of polycyclic hydrocarbons in aqueous DNA soln. had occurred as reported earlier by the authors. However, since centrifugation in tubes of glass or quartz led to no such removal of hydrocarbons, it was concluded that the reported removal of the hydrocarbons was due mainly to their adsorption onto the surface of the polymer tubes. (See also CRA 1(4):#642, 1963, and *ibid.*, 3(2):#246, 1965.)

- 65-266 CHANGES IN RIBOFLAVIN CONTENT IN THE COURSE OF EXPERIMENTALLY INDUCED CARCINOGENESIS IN RATS. (E.) Rubenchik, B. L. (Ukrainian Res. Inst. Nutrit., Kiev). Fed. Proc. (Transl. Suppl.) 23(4)(Pt.2):T799-T802, 1964.

See CRA 1(8):#1459, 1963. The effect in rats of oral p-dimethylaminoazobenzene on riboflavin metabolism is treated in some detail. Oral admin. of amaranth and its nucleotides had little effect. This article is an English version of a Russian paper published in Vop. Pitan. 22(3):72, 1963.

- 65-267 INDIRECT INDICATIONS TO THE POTENTIAL CARCINOGENICITY OF DRUGS. (E.) Elis, J. and H. Raskova. Excerpta Med. (Ser. LXXV): 3:41-50, 1964.

The necessity of developing efficient (uncomplicated, yet valid) indirect indicators, which could point to a compound as a potential carcinogen, is stressed. There seems to be a positive correlation between teratogenic and carcinogenic action. Teratogenic and antifertility action may also be related. When admin. p.o. to mice, ethylene glycol, 2-naphthylamine, benzidine, and Tween 80 (0.1 or 0.4 of the parenteral LD₅₀) reduced the size of litters markedly, the degree of effect depending on the dose. Fertility was also markedly reduced in mice by 6-azauridine and 6-azacytidine (50-200 mg/kg/d x 18, i.p.). Chromosomal damage is the most valuable indicator of the potential carcinogenicity of a compound; the onion root technic and the tissue culture technic

Using human diploid cells seem to be worthwhile. Cooperation in computing experimental results might accelerate the compilation of more conclusive evidence for or against the validity of indirect indicators of carcinogenicity. Also, positive correlations may be found between the direct and indirect indicators of carcinogenicity, thus simplifying the task of testing new compounds. In a discussion, Professor Berenblum stated that the only proof that a substance is carcinogenic is that it produces tumors, and therefore long-term carcinogenicity tests can never be replaced by other types of short-term tests. He objected that such short-period "indirect" tests may be taken seriously as true guides for carcinogenicity or non-carcinogenicity. If they should serve only as preliminary screening tests to be followed by complete tests, why not do the complete test at once instead of wasting time and money?

65-268 INVESTIGATIONS ON THE MUTAGENIC ACTION OF VARIOUS NITROSAMINE AND NITROSAMIDE COMPOUNDS. (Ger.) Pasternak, L. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin, Berlin-Buch). Arzneimittelforschung 14(7):802-804, 1964.

In addition to the compounds studied in CRA 1(5):386, 1963, mutagenic action in Drosophila melanogaster was also found for the carcinogens dimethylnitrosamine, methylbenzyl nitrosamine and methylvinyl nitrosamine, and the questionably carcinogenic compound N-methyl-N-nitrosopiperazine.

65-269 CARCINOGENIC EFFECT OF ETHER EXTRACT OF WHOLE EGG, ALCOHOL EXTRACT OF EGG YOLK AND POWDERED EGG FREE OF THE ETHER EXTRACTABLE PART IN MICE. (E.) Szepeswol, J. (Dept. Anat., U. Puerto Rico Sch. Med., San Juan). Proc. Soc. Exp. Biol. Med. 116(4):1136-1139, 1964.

T.M. mice were maintained from the age of 4 wk. on Rockland Diet (RD), RD supplemented with ether extract of whole powdered egg (RDEW), or with alcohol extract of raw egg yolk (RDAY), or with egg protein (whole powdered egg from which the ether extractable part had been removed; RDEP) and allowed to breed for 5-6 generations, the offspring being maintained on the same diets. Incidence of malignancy for RD, RDEW, RDAY, and RDEP was 22/138, 156/200, 179/225, and 81/112, resp.; that for lung adenocarcinoma was 14/138, 77/200, 63/225, and 14/112, resp.; that for lymphosarcoma was 4/138, 38/200, 35/225, and 10/112; and that for mammary cancer (in females) was 2/61, 61/96, 99/118, and 63/75, resp. The results indicate that the lipids of the egg are as carcinogenic as the whole egg and that there is more than one carcinogenic lipid present. In the case of the group fed with RDEP, the carcinogenicity was ascribed to the unextracted lipids rather than to egg proteins. For earlier studies see CRA 1(4):#662, 1963.

65-270 ADENOMAS, ADENOCARCINOMAS, AND MULTIFOCAL DYSPLASIA OF ALVEOLAR CELLS IN MOUSE LUNGS; A PULMONARY RESPONSE TO INTRAVAGINAL APPLICATIONS OF 20-METHYLCHOLANTHRENE. (E., Abstract) Campbell, J. S. (Dept. Path., U. Ottawa, Canada) and Y. H. Yang. Lab. Invest. 13(8):952, 1964.

Multiple lung tumors, mostly adenomas, occurred in 24/106 (22.6%) ICR Swiss virgin mice to which 20-methylcholanthrene (MC) had been applied intravaginally in amounts so small that only 6/106 developed vaginal or cervical carcinoma and/or dysplasia during their life-span. Similar lesions appeared in only 3.8% of untreated controls; similar treatment of pituitary dwarf Bar Harbor strain mice with MC resulted in the appearance of 1/101 adenoma of the lung. Of 111 lung tumors, 4 were malignant. These were alveolar adenocarcinomas presumably arising from alveolar adenomas. It is inferred that similar exposure of other tissues to very small amounts of carcinogen may be occasionally influential in human lung carcinogenesis.

65-271 EFFECT OF POLYVINYL SULFATE ON GROWTH AND MITOTIC ACTIVITY OF EXPLANTS OF NORMAL AND NEOPLASTIC MOUSE AND RAT TISSUES. (E.) Rovenskii, Ya. A. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Fed. Proc. (Transl. Suppl.) 23(4)(Pt.11):T796-T798, 1964.

This article is the English version of a Russian article published in Vop. Onkol. 9(9):18, 1963. Explants of tissues cultivated on media containing polyvinyl sulfate (PVS; 0.02 or 0.1 mg/ml) showed some inhibition of growth as compared with untreated control tissue cultures. However, where normal tissues were reduced by PVS to 20-40% of controls, the most sensitive tumor tissue, Sarcoma 45, was reduced to 45-60% of control growth, while Crocker sarcoma and 9,10-dimethyl-1,2-benzanthracene-induced rat sarcoma explants showed only slight growth inhibition.

65-272 ELECTRON MICROSCOPY OF EXPERIMENTAL CEREBELLAR GLIOMAS. (E.) Ishida, Y. (Dept. Path., Gunma U. Sch. Med., Japan), S. Kawai, K. Sato, H. Niibe and I. Nagashima. Gunma J. Med. 13(1):79-90, 1964.

Pellets of 20-methylcholanthrene were implanted into the cerebellum of 107 mice (C3H, ddN, CF1, CFW, and C57B strains) and of 30 rats (Donryu strain). Among the 137 animals, 29 tumors developed in the cerebellum (13 gliomas, 9 glioblastomas, 2 astrocytoma-like tumors, 1 ependymoma-like tumor, 1 mixed cell tumor, 14 sarcomas, 2 meningiomas); 28/29 were in mice, only one (a meningioma) was in a rat. Thirteen of 29 were histologically classified as gliogeneous tumors. Electron microscope observations of these animal tumors and of 3 human medulloblastomas (HM) are described, but no correlation in structure between the animal tumors and HM could be found. The cell

of origin in HM has not been identified. (See also CRA 1(11):#1917, 1964.)

- 65-273 EFFECT OF PREGNANCY ON SPONTANEOUS LEUKAEMIA IN MICE. (E.) Lemonde, P. (U. Montreal, Canada). *Brit. J. Cancer* 18(2): 217-321, 1964.

Inbred AK females that were mated and became pregnant showed a significant delay in the development of spontaneous lymphoid leukemia as compared with virgins. This effect increased with the number of pregnancies and seemed to be attributable to increased secretion of adrenocortical hormones during pregnancy. The incidence of leukemia (91%) did not change after pregnancy. In the males that did not develop leukemia, the life span of mated animals was prolonged. In C3Hf mice, no significant differences in life span nor in the low (2%) incidence of leukemia were evident in mated or unmated animals of either sex. (17 references)

- 65-274 THE PRODUCTION OF MALIGNANT TUMOURS BY NICKEL IN THE RAT. (E.) Heath, J. C. (Strangeways Res. Lab., Cambridge, England) and M. R. Daniel. *Brit. J. Cancer* 18(2):261-264, 1964.

Ten female hooded strain rats (2-3-months-old) were inj. i.m. (thigh) with a suspension of 0.0283 g of nickel metal powder, and all developed rhabdomyomas with anaplastic elements at the inj. site 17-22 wks. later; 3/10 showed prevertebral lymph node metastases. Subsequent transplants of primary tumors grew rapidly (about 11 days), indicating a high malignancy of the anaplastic component. All primary tumors were invasive. Altered muscle fibers were evident at the periphery of the tumors. In some tumors, there were muscle fibers in which the central sarcoplasm was replaced by a mass of cells which were round, spindle-shaped, or in mitosis (muscle cell tubes).

- 65-275 EFFECT OF NITROSAMINE DERIVATIVES ON ENZYME CONCENTRATIONS IN RAT ORGANS DURING CARCINOGENESIS. (E.) Hoch-Ligeti, C. (VA Ctr., Martinsburg, W. Va.), L. T. Lobl and J. M. Arvin. *Brit. J. Cancer* 18(2):271-284, 1964.

Wistar rats (av. wt. 55 g) received intragastrically diethylnitrosamine (DEN; 550 µg x5/wk.; max. total dose 82.5 mg) or dimethylnitrosamine (DMN; 400 µg x5/wk.; max. total dose 60 mg). The first hepatic tumors occurred on day 113 in a DMN-treated male, and on day 122 in a DEN-treated female rat. No general toxicity was seen at these doses. Other groups of rats received 1200 µg DMN or 1560 µg DEN daily for 4 wk.; all developed hepatic tumors. One rat given DEN developed pulmonary metastases. As compared to controls, the β-glucuronidase (G-ase) of the liver increased significantly and suddenly between day

50-70 (thus preceding tumor appearance by several weeks); this increase was more pronounced in females than in males. G-ase increased gradually and to a lesser degree in the kidney and was significantly elevated in the lung after day 130. The increase in G-ase in the organs was related to the length of treatment and not to the amount of carcinogen admin. During increased G-ase activity of the liver, large cells with hyperchromic nuclei and vacuolized cytoplasm appeared in the central areas of the lobules. The lactic dehydrogenase (LDH) conc. was not increased in the livers of rats during induction of tumors by DEN or DMN; it was significantly lower in the hepatic tumors than in the surrounding tissues.

- 65-276 OXIDATIVE DEGRADATION OF NITROSAMINES WITH ENZYME-FREE MODEL SYSTEMS. (Ger.) Preussmann, R. (Dept. Surg., U. Freiburg i. Br., Germany). *Arzneimittelforschung* 14(7):769-774, 1964.

Ultraviolet radiation plus H₂O or H₂O₂ caused cleavage of the double bond in nitrosamines, but Fenton's reagent and alkaline peroxydisulfate had no effect. The hydroxylase system (described by S. Udenfriend et al., and consisting of the Fe⁺⁺ complex of EDTA, ascorbic acid and O₂) also had an oxidative effect on nitrosamines, forming several new reaction products; O₂ was required for the reaction. The oxidized nitrosamines are stable and probably can be isolated and identified.

- 65-277 MODEL TRIALS IN CHEMICAL CARCINOGENESIS AND THE PHOTODYNAMIC EFFECT OF 3,4-BENZOPYRENE AND UV-LIGHT IN AQUEOUS PROTEIN SOLUTIONS WITH VARIOUS SH-GROUP REACTIVITY. (Ger.) Reske, G. (Inst. Physical Biochem., U. Frankfurt/Main, Germany) and J. Stauff. *Zschr. Naturforsch.* (B) 19(8):716-726, 1964.

Irradiation of β-lactoglobulin solutions containing 3,4-benzopyrene with UV light of the wavelength 366 mµ produces changes in the heat-denaturation characteristics of the protein; the same changes were produced without 3,4-benzopyrene at 280 mµ.

- 65-278 CHLORNAPHAZIN (ERYSAN) MAY INDUCE CANCER OF THE URINARY BLADDER. (E.) Videbaek, A. (Med. Dept. C, Copenhagen County Hosp., Gentofte, Denmark). *Acta Med. Scand.* 176(1):45-50, 1964.

See CRA 2(2):#221, 1964.

- 65-279 STUDIES OF SOME ASPECTS OF HEPATIC NUCLEOTIDE METABOLISM IN RATS TREATED WITH 4-DIMETHYLAMINOAZOBENZENE (DAB) AND 2-ACETYLAMINOFLUORENE (AAF). (It.) Rabbi, A. (Inst. Biol. Chem., U. Urbino, Italy), C. M. Caldarera and C. Rossoni. *Boll. Soc. Ital. Biol. Sper.* 39(24): 1825-1828, 1963.

male albino rats (age 90 days; wt. 180-200 g),
tion of 0.06% DAB to the basic Popper diet
7 days decreased the activity of liver poly-
leotide phosphorylase and adenosine deaminase,
reas aspartic transcarbamylase and liver RNA
DNA content were all increased. Similar re-
ts were obtained with 0.04% AAF; with the
ter, however, the increase in liver DNA was
her than with DAB while RNA was decreased.
se enzymatic changes were considered to be the
ression of an increased biosynthesis as well
a retardation of catabolic processes in nucleo-
le catabolism. (See also CRA 1(12):#2099, 1964.)

280 EXPERIMENTAL STUDIES ON "SYNCARCINO-
GESIS". (Ger.) Schmähl, D. (Inst.
ch., U. Bonn, Germany). Krebsforsch. Krebsbe-
pf. 5:127-130, 1964.

See CRA 1(4):#666 and #675, 1963; and ibid., 2(7):
277, 1964.

281 THE INCIDENCE OF INFECTIOUS DISEASES,
HEMOPATHIES AND NEOPLASMS IN WORKERS
POSED TO CARBON DISULFIDE. (It.) Di Vito, G.
nst. Occupat. Med., U. Pavia, Italy) and G. L.
nni. Folia Med. (Napoli) 46(11):972-979, 1963.

study of the incidence of cancer among workers
the same industrial plant (1,165 workers/yr.)
ring the period 1959-1961 gave no conclusive
idence as to an increase or decrease in fre-
ency after exposure to carbon disulfide. The
vestigation should be carried out over a longer
riod of time in order to have data of statisti-
l significance.

282 CHANGES IN THE MUCOSA AND SKIN OF THE
RAT LIP INDUCED BY PODOPHYLLIN. (It.)
stro, G. (Odontiat. Clin., U. Messina, Italy).
ch. Ital. Anat. Istol. Pat. 37(4):340-347, 1963.

podophyllin was applied by dripping a 0.5% soln.
r 2 minutes/day for 3 wk. over the mucosa and
in of the lower lip of 6 rats. Epithelial pro-
feration with atypical cell formation, dyskera-
sis and hyperkeratosis were observed. Changes

similar to those found in the intraepithelial, or
in situ, carcinoma were also observed.

65-283 CUMULATIVE EFFECT OF CIGARETTE SMOKE
INHALATION AND INFLUENZA VIRUS INFECTION
ON THE FORMATION OF ATYPICAL PROLIFERATIONS IN THE
BRONCHIAL EPITHELIUM OF MICE. (Ger., Abstract)
Leuchtenberger, C. and R. Leuchtenberger.
Krebsarzt 19(4):288, 1964.

Cigarette smoke inhalation and influenza virus
infection caused similar morphologic changes in
the bronchial mucosa. No carcinogenic effect was
noted. The significance of the "time" factor in
the genesis of bronchial carcinoma is considered.
(See also CRA 1(5):#838, 1963.)

65-284 3,4-BENZOPYRENE AS A GROWTH FACTOR IN
PLANTS. (BRIEF REPORT). (Ger.)
Gräf, W. (Inst. Hygiene, U. Erlangen, Germany).
Arch. Hyg. Bakt. 148(6):489-493, 1964.

3,4-Benzpyrene (10 µg/liter in aqueous soln.)
showed growth promoting effect when tested in soil
and water cultures of kohlrabi.

65-285 STUDIES ON THE METABOLIC N-DEMETHYLATION.
III. ACCELERATION OF DRUG METABOLIZING
ENZYME IN RAT LIVER. (E.) Kuroiwa, Y. (Pharmaceut.
Inst., Tohoku U. Sch. Med., Sendai, Japan),
K. Minegishi and S. Okui. Chem. Pharm. Bull.
(Tokyo) 11(12):1540-1545, 1963.

Liver homogenates were prepared from male Wistar
rats weighing 150-200 g which previously had been
admin. dimethylaminoazobenzene (20 mg), benzpyrene
(2 mg i.p.) or 20-methylcholanthrene (MC; 5 mg
i.p.). Demethylation or hydroxylation of N-methyl-
barbiturates (the enzyme activity was localized in
the microsomal fraction of the homogenate) were
generally decreased by pretreatment with carcino-
gens, in contrast to a marked increase of this
activity following pretreatment with certain bar-
biturates. Pretreatment with MC stimulated de-
methylation of 3-methylmonomethylaminoazobenzene
but had no effect on demethylation of methylbar-
bital.

See also abstracts nos.: 205,207,215,216,217,331,333,376

VIRAL CARCINOGENESIS

- 65-286 CULTIVATION OF SIMIAN VIRUS SV 40 IN CONTINUOUS HUMAN DIPLOID CELLS. (E.) Chumakov, M. P. (Inst. Poliomyelitis, Acad. Med. Sci., Moscow, USSR), A. N. Mustafina, M. Ya. Chumakova, V. Ya. Karmysheva, N. M. Shestopalova and V. N. Reingold. Acta Virol. (Praha) (Eng.) 8(3):217-224, 1964.

Detailed observations on prolonged cultivation of A-426 strain of vacuolating simian virus SV40 in continuous human embryo diploid skin muscle cells (lines SM-15, 26, and 39) are reported. Cell transformation occurred in monolayer SM cultures inoc. with undiluted or 10^{-1} virus suspensions but not with suspensions diluted 10^{-3} or over (observation time, 15 wk.). Inoc. of SM cell suspensions resulted in acute infection and formation of symplasts, leading to death of the whole cell population within 1.5-2 wk.

- 65-287 AN IMPROVEMENT FOR ELECTRON MICROSCOPIC RESOLUTION OF POLYOMA VIRUS CAPSOMERES. (E.) Breese, S. S., Jr. (Agricult. Res. Serv., Greenport, N. Y.). Virology 24(1):125-126, 1964.

A method is described for making positive prints of polyoma virus particles, by combining palladium shadowing and staining with phosphotungstic acid. This gives a much better resolution of the capsomeres than can be obtained by the usual negative staining alone. The method may prove useful for determining the architecture of capsomeres in other viruses.

- 65-288 TUMOR INDUCTION BY ROUS SARCOMA VIRUS ON THE CHORIOALLANTOIC MEMBRANES OF RECIPROCAL CROSSES BETWEEN RESISTANT AND SUSCEPTIBLE STRAINS OF CHICKENS. (E.) Bower, R. K. (Grad. Res. Inst., Baylor U., Dallas, Texas), N. R. Gyles and C. J. Brown. Virology 24(1):47-50, 1964.

The chorioallantoic membranes (CAM) of 269 White Leghorn chick embryos, inoc. on day 11 of incub. with 0.05 ml of Rous sarcoma virus (RSV) CT-905 at 3 different dilutions (1:3,200, 1:5,000, and 1:10,000), averaged 116.5 tumors/CAM as compared to 10.4/CAM for 203 Jungle Fowl-Cornish strain embryos. White Leghorn males mated to Jungle Fowl-Cornish females av. 85.53 tumors/CAM, whereas chick embryos from White Leghorn females in the reciprocal cross av. 69.42 tumors/CAM. The insignificant difference between the reciprocal hybrids indicates the absence of sex linkage and maternal effects. Since both reciprocal crosses showed av. tumor counts slightly above the midpoint between the av. of the parental strains (for all dilutions), this suggests either a lack of dominance between susceptibility or resistance or a slight partial dominance for susceptibility over resistance to RSV. (See also CRA 2(2):#285, 1964.)

- 65-289 PRODUCTION OF SV-40 COMPLEMENT-FIXING ANTIGEN. (E.) Schell, K. R. (Microbiol. Assoc., Inc., Bethesda, Md.). Nature (London) 203:417-418, 1964.

Cell cultures of the primary African green monkey kidney (AGMK) and serially propagated BS-C-1 were inoc. with strain No. 776 of SV40. With small doses, the CPE appeared within 3-4 wk.; with larger doses, incub. time was shortened to 2-4 days. At the time of the max. CPE, the culture was prepared as complement-fixing antigen. A 1/40 dilution of pooled "normal" monkey serum with an original complement-fixing titer of 1/128 was used as antibody source. It was found that the complement-fixing antigen yield increased significantly at minimal virus inputs. Preliminary data indicate that the cause of this inverse relationship is not interferon, nor the presence of toxin, nor a contaminating virus, nor the age of the host cell culture.

- 65-290 IMMUNOLOGICAL STUDIES OF THE ROUS SARCOMA VIRUS. (E., Ph. D. Thesis, Order No. 64-5463, Univ. Microfilms, Inc., Ann Arbor, Mich.). Khan, Z. H. (Indiana U., Bloomington). Diss. Abstr. 25(1):29, 1964.

Of 3 strains of Rous sarcoma virus (RSV), RSV-Bryan (RSV-B) and RSV-Ahlistrom (RSV-A; Mill Hill) induced tumors in adult mature turkeys. RSV-B and RSV-A strains induced tumors in chicken as well as turkey embryonated eggs. Small hemorrhagic spots on CAM lesions were observed with RSV-A strain. RSV-Harris (RSV-H) induced large tumors on chick CAM, but only small foci were observed on turkey CAM. RSV-H induced tumors in turkey poults but not in adults. An inverse relationship to tumor production on turkey embryonated eggs was observed in comparison to the turkey poults. This inverse relationship may be due to passively transferred antibodies in turkey eggs or due to genetic factors. RSV-H produced no tumors in adult turkeys. When RSV-H was serially propagated in embryonated turkey CAM and subsequently inoc. in adult turkeys, tumors occurred. Therefore, the viral tumor induction may be related to adaptation of the virus to the host. All the experimental turkey sera were found to be negative for anti-Forsman antibodies. In turkeys made tolerant to chicken cells, tumor production was enhanced as compared to the turkeys made tolerant to sheep cells (Forsman antigen). Turkeys exhibited a positive host response when made tolerant to chicken's RBC. Regression of tumors in turkeys was not found to be due to anti-Forsman antibodies. Tumor induction in turkeys may be related to adaptation of the virus to the host rather than to pre-conditioning of the host to Forsman antigen. Inoculation of the 3 strains at 28 days of age did not produce tumors in rats which were made tolerant to Forsman antigen after birth. Preparations of the RSV-B tumors passed in turkey and chicken CAM antigens

compared with antisera to both antigens. A titative tumor specific reaction was observed both systems and could not be eliminated after absorption of the antitumor sera with sheep cells. Therefore, the tumor specific antibody was not anti-Forssman antibody. A purified preparation of RSV-B did not precipitate with anti-Forssman antibodies, thus confirming that RSV-B does not have a Forssman-like antigen in its position.

291 SOME RECENT STUDIES ON MOUSE TUMOR VIRUSES: THE BITTNER MAMMARY TUMOR VIRUS AND THE GROSS LEUKEMIA VIRUS. (E.) Chładowski, L. (Dept. Virol., U. Texas M. D. Person Hosp., Houston). Ann. Med. Chir. (Prague) 54(4):752-771, 1963.

review (26 references) and some new observations on the structure and transmission of the Bittner mammary tumor virus and the Gross leukemia virus are presented. It was concluded that leukemia virus particles are present in the milk and organs of mice before the symptoms of "spontaneous" induced leukemia develop. Mammary tumors of mice and leukemia in mice may be considered a predetermined disease, the final manifestation of which may depend on genetic, hormonal, and environmental factors. (See also CRA 1(3):#460; ibid., (5):#902; ibid., (8):#1433, 1963; ibid., (12):#2059; and ibid., 2(2):#189, 1964.)

292 CYTOPATHOGENICITY OF FOWL TUMOUR VIRUSES (RSV AND AMV) IN NORMAL AND TRANSFORMED CELLS OF HUMAN ORIGIN. (E.) Chýle, P. (Inst. Biol. Genet., Czech. Acad. Sci., Prague). Czechoslovakia Biol. (Praha) 10(4):319-320, 1964.

attempts to render human cells malignant, a marked CPE was repeatedly elicited by infection with RSV (strain Prague, RSV-P; and strain Schmidt-Ruppin, RSV-SR) in human embryo explants (E), Hayflick's human diploid cells WI-38, cells from a malignant teratoma ("Lutu"), and by infection with the avian myeloblastosis virus (AMV) on HE and WI-38 cultures. With conc. RSV-P and RSV-SR acting on HE and FL-amnion cells, a rapid CPE was often seen; a more gradual CPE occurred in "Lutu" cultures infected with RSV-SR, and with RSV acting on mixed cultures of chick Rous sarcoma cells (CRS) such as HE + CRS and HeLa + CRS. It was impossible to recover any infectious RSV from culture fluids or from the cultured cells between day 4-90 after infection of 7-10-day-old chicks. With AMV, however, GPE was readily transferable to further human cell cultures, and back transfers to 1-day-old chicks elicited leukocytic reactions.

293 A STUDY OF SHOPE PAPILLOMA VIRUS DNA. (E.) Crawford, L. V. (Inst. Virol., U. Glasgow, Scotland). J. Molec. Biol. 8(4):489-495, 1964.

Papilloma virus DNA has 2 components with sedimentation coefficients of 21 s and 28 s, both of which have the same molecular wt. and density. The 28 s component may be a double-stranded ring with a link (unstable at low pH) connecting the 2 ends of the molecule, that opens to convert to 21 s. The 21 s component showed strand separation and may be a linear molecule without natural cross-links or with cross-links that are heat- and formaldehyde-sensitive. (See also CRA 1(2):#264, 1963; ibid., 1(11):#1956, 1964.)

65-294 STUDIES OF THE PRODUCTION AND PURIFICATION OF POLYOMA VIRUS. I. THE EFFECT OF SODIUM BICARBONATE ON THE PRODUCTION OF POLYOMA VIRUS. (E.) Amako, K. (Dept. Bact., Kyushu U. Sch. Med., Fukuoka, Japan). Kyushu J. Med. Sci. 15(1):11-20, 1964.

SE polyoma virus (Stewart strain 105) in culture medium containing various conc. of NaHCO₃ (0.035-0.25% at pH 7.4-8.6) had high hemagglutination (HA) titers (for approx. 1 mo. starting with day 4) in all concs. except the lowest. In cultures lacking the bicarbonate, those at pH 8.5, and in other cultures with varied concs. of NaHCO₃ and constant pH (7.0), the amounts of intracellular viruses were similar; the total HA produced were essentially equal in the cultures with varied bicarbonate conc., thus the production of virus was influenced by the pH level of the culture rather than the bicarbonate conc. (See also the following abstract.) Experiments at pH 8.0 and pH 6.5 showed that in media with a low pH release of virus from infected cells was inhibited.

65-295 STUDIES OF THE PRODUCTION AND PURIFICATION OF POLYOMA VIRUS. II. PURIFICATION WITH DEAE CELLULOSE CHROMATOGRAPHY. (E.) Amako, K. (Dept. Bact., Kyushu U. Sch. Med., Fukuoka, Japan). Kyushu J. Med. Sci. 15(1):21-28, 1964.

SE polyoma virus (strain 105) chromatographed on a DEAE cellulose column was readily recovered in fractions eluted with 0.50-2.0 M NaCl. When dialysis against a phosphate buffer and treatment with fluorocarbon was performed prior to chromatographic purification, a relatively pure polyoma virus hemagglutinin was obtained from the above eluates. Chromatography after sonic vibration of the virus particles produced results essentially the same as those observed in non-sonicated materials. (See also the preceding abstract.)

65-296 PREVENTION OF TUMOUR INDUCTION IN SV40-INFECTED HAMSTERS. (E.) Deichman, G. I. (Inst. Exp. Clin. Oncol., Acad. Med. Sci., Moscow, USSR) and T. E. Kluchareva. Nature (London) 202:1126-1128, 1964.

See CRA 2(6):#1136, 1964.

- 65-297 CROSS NEUTRALIZATION TESTS OF MOUSE LEUKEMIC VIRUSES ISOLATED BY PASSING THROUGH GUINEA PIG BRAINS. (Jap.) Shinagawa, K. (Dept. Intern. Med., Okayama U. Sch. Med., Japan) and H. Shimo. Saibokaku Byorigaku Zasshi (J. Karyopath.) 8(2):87-93, 1963.

In order to clarify the unexpected development of myeloid leukemia in the course of successive cell-free spleen filtrate transplantations of spontaneously occurring lymphatic leukemia in C58 and AKR mice, the authors attempted to identify viruses by passing homogenates (0.2 ml in 2 ml normal saline) of the enlarged spleen and liver through the brains of normal guinea pigs (wt. 200-250 g) 8 times and by a cross-neutralization test of viruses. The results indicated that the viruses responsible for the original lymphatic leukemia and those responsible for subsequently appearing myeloid leukemia were immunologically close to each other but still two different types of viruses. Factors determining the type of manifest leukemia were considered to lie in differences in the histologic affinity of the two types of viruses; immunologically they were found to be considerably different from each other.

- 65-298 STUDIES ON THE EFFECT OF 5-FLUORO-2'-DEOXYURIDINE ON POLYOMA T FORMATION IN MOUSE EMBRYO CELLS. (E.) Sheinin, R. (Div. Biol. Res., Ontario Cancer Inst., Toronto, Canada). Virology 22(3):368-376, 1964.

In secondary cultures of mouse embryo cells infected with polyoma T virus, the presence of 5-fluoro-2'-deoxyuridine (FUDR; 10^{-5} M) for up to 17.5 hr. had no effect on the subsequent time course of the virus formation when FUDR was removed, which indicated that the viral DNA is synthesized very late during the latent period (no more than 30 min. prior to the formation of the intact virion). This conclusion was also supported by a personal communication from R. Weil who found that infectious DNA could not be isolated from polyoma-infected cells at any time prior to that at which intact virus first began to appear. Using the fluorescent antibody staining technic, polyoma protein was found to be synthesized under conditions in which no DNA and no infectious virus were made. FUDR totally and immediately inhibited the incorporation of cytidine-2- C^{14} into the DNA of the mouse cell while its incorporation into the protein was not inhibited.

- 65-299 CELL-VIRUS INTERACTIONS WITH THE SHOPE FIBROMA VIRUS ON CULTURES OF RABBIT AND RAT CELLS. (E.) Israeli, E. (Weizmann Inst. Sci., Rehovoth, Israel) and L. Sachs. Virology 23(4):473-485, 1964.

In vitro, Shope fibroma virus (SFV) had a similar course of virus multiplication in both rabbit and rat cells, with a lower percentage of virus-yielding cells and yield per cell in rat cultures. In

rabbit and rat primary or secondary monolayers SFV produced a CPE with pock formation. Pocks on rabbit cultures lysed to form plaques, but those on rat cultures remained intact with only a partial cell lysis at the periphery. Time of pock formation in rat cultures and pock to plaque transition in rabbit cultures were inhibited by a factor in the agar overlay which could be precipitated by protamine sulfate. In rabbit cultures other than primary or secondary monolayers, pocks were not formed following infection of sparse cultures or in clones of infected cells or after infection of monolayers derived from 28 embryo cell clones. In infected monolayers, rabbit testes cultures had an increased mitotic frequency at the time of pock formation which was not observed in rabbit or rat embryo cells. It was suggested that SFV may produce pocks as a result either of cell aggregation or of increased mitotic activity.

- 65-300 SOFT TISSUE LESIONS AND TUMOURS ASSOCIATED WITH OSTEOPETROSIS GALLINARUM VIRUS. (E.) Campbell, J. G. (Poultry Res. Ctr., Edinburgh, Scotland), D. E. Young and J. G. Carr. J. Comp. Path. Ther. 74(3):263-279, 1964.

Of 232 inbred brown leghorn chicks inoc. with the osteopetrosis gallinarum virus (in blood), 118 developed osteopetrosis (100 males, 18 females). In addition, there occurred 18 muscle lesions, 21 renal cysts, 12 renal tumors, and 4 monoblastic tumors (histioblastoma). Among the 20/232 birds inoc. with freeze-dried blood (all others received fresh blood), there was only 1 case of osteopetrosis, but 24 of the above soft tissue lesions and tumors occurred in these animals. Other conditions were fowl paralysis (3) and bile duct carcinoma (1) in the animals inoc. with fresh blood as well as one ovarian carcinoma and one bile duct carcinoma in those inoc. with freeze-dried blood. Virus-like particles were found associated with both periosteal cells and soft tissue neoplasms (except marrow).

- 65-301 EFFECT OF VARYING THE SITE OF INTRADERMAL INOCULATION OF MYXOMA VIRUS ON THE COURSE OF THE DISEASE. (E.) Chapple, P. J. (Common Cold Res. Unit, Salisbury, Wiltshire, England) and R. C. Muirhead-Thomson. J. Comp. Path. Ther. 74(3):366-372, 1964.

Rabbits infected via the ear tips by means of the bite of myxoma-virus-infected fleas or by intradermal inj. by the virus had longer disease incub. periods and survivals than rabbits bitten on the head or back, or inoc. into the flank skin. The epidermis of the ear was much thinner than that of the flank in the domestic rabbit strains used, excepting the lop-ear rabbit, which had ear skin almost as thick as flank skin, and which showed no such differential survival times with different sites of inoc. Methylene blue diffusion studies suggested that skin structure may affect the course of myxomatosis after inoc. because rapid

ymph drainage from thin-skinned ears discourages establishment of a primary lesion at the inj. site.

- 302 HOMOLOGY BETWEEN RNA FROM ROUS SARCOMA VIRUS AND DNA FROM ROUS SARCOMA VIRUS-INFECTED CELLS. (E.) Temin, H. M. (McArdle Lab., U. Wisconsin, Madison). Proc. Nat. Acad. Sci. USA 52(2):323-329, 1964.

labeled RNA from the Rous sarcoma virus (RSV) and homology with DNA from RSV-infected chick embryo cells but not with DNA from parallel uninfected cells. Two techniques used for confirming this homology are described in detail.

- 303 SUCCESSFUL INDUCTION OF TUMOURS IN SYRIAN HAMSTERS BY CELL-FREE ROUS SARCOMA FILTRATE. (E.) Klement, V. (Inst. Exp. Biol. Genet., Czech. Acad. Sci., Prague). Folia Biol. (Praha) 10(4):321-324, 1964.

cell-free filtrate of Rous chicken sarcoma (RS; Schmidt-Ruppin strain) admin. s.c. to newborn Syrian hamsters in 5 divided doses of 1 ml each, 12 hr. apart (total dose 5×10^2 chicken LD₅₀), induced tumors at the site of inj. beginning 2 wk. later. All the tumors were invasive, metastasizing, polymorphocellular sarcomas, lethal to their hosts in 25 to 141 days (av. 89). None of these hamster tumors could induce tumors in chicks, and no infectious virus was recoverable from them. These findings suggest that the inoculum may, as a depot, release continuously for some time, enough virus to ensure the malignant transformation of the host cells. This mechanism may not operate in the Prague strain of Rous chicken sarcoma, where a similar attempt to induce hamster sarcomas failed after 5 mo., even at a 10x higher dosage; or, this strain might require a longer latent period. (See also CRA 1(8):#1547, 1963; ibid., 1(12):2132; and ibid., 2(3):#518, 1964.)

- 304 COOMBS-POSITIVE HEMOLYTIC ANEMIA AND GENERALIZED AMYLOIDOSIS IN MICE FOLLOWING TRANSMISSION OF SUBCELLULAR LEUKEMIA MATERIAL. (E.) Rask-Nielsen, R. (Inst. Biochem., U. Copenhagen, Denmark). Proc. Soc. Exp. Biol. Med. 16(4):1154-1159, 1964.

newborn as well as adult DBA/2 and (DBA/2 x CBA)F₁ mice of both sexes, which were inoc. s.c. or i.p. with cell-free supernatant fluid or with virus extract of leukemic tissue or plasma from various types of murine plasma cell leukemias, developed a disease characterized by hypergammaglobulinemia, wt. loss, anemia, marked splenic, renal and hepatic amyloidosis and plasma cell infiltrations in the lungs. The disease was also transmissible through the placenta or with the milk of infected mice. The disease affected all DBA/2 males; survival was shorter and the anemia more severe than in DBA/2 females and in the hybrid mice. The

creation of an autoimmune mechanism by the antigenic effect of the virus-transformed host cells appears to mediate the development of the lesions. (See also CRA 1(4):#767, 1963; ibid., (11):#1960, 1964; and ibid., 2(3):#598, 1964.)

- 65-305 THE AKR THYMIC ANTIGEN AND ITS DISTRIBUTION IN LEUKEMIAS AND NERVOUS TISSUES. (E.) Reif, A. E. (Dept. Surg., Tufts U. Sch. Med., Boston, Mass.) and J. M. V. Allen. J. Exp. Med. 120(3):413-433, 1964.

With the use of immune cytolysis and a new method for the quantitative treatment of data from absorption experiments, AKR mouse lymphocytes of thymic and non-thymic origin were found to be antigenically distinct. A high conc. of AKR thymic antigen (TA) was found only in the thymus of AKR newborn mice; in adult AKR mice, however, TA was present at a high level in the thymus, all nervous tissues tested and some leukemias. Much lower levels were found in lymph node lymphocytes, splenic lymphocytes, lung, and certain leukemias which probably were of non-thymic origin. The AKR TA was also present at a high level in thymus and nervous tissues of RF mice, but was absent from the thymus of 16 other mouse strains (which possessed the C3HeB/Fe TA). The distribution of the C3HeB/Fe TA in neonatal and adult tissues of all the strains tested was similar to that of the AKR TA in AKR mice.

- 65-306 ISOLATION OF ADENOVIRUSES FROM NEOPLASTIC AND NON-NEOPLASTIC TISSUES OF CHILDREN. (E.) McAllister, R. M. (Dept. Pediat., U. Southern California Sch. Med., Los Angeles), B. H. Landing and C. R. Goodheart. Lab. Invest. 13(8):894-901, 1964.

Adenoviruses were recovered from tissue cultures of 2/17 non-neoplastic and 3/36 neoplastic biopsy specimens taken from children who showed no clinical evidence of adenovirus infection. The neoplasms cultivated included: brain tumors 8, neuroblastomas 7, Wilms' tumors 2, Hodgkin's disease 2, lymphomas and leukemia 4, carcinomas 2, sarcomas 3, undifferentiated malignancy 1, and benign tumors 7. In indicator cell cultures of HeLa, human fetal fibroblasts and African green monkey kidney cells, no supernatant fluid from the malignant or the nonmalignant tissues interfered with the CPE of vesicular stomatitis virus. Of the 3 malignant tissue cultures from which adenovirus was isolated, 2 (malignant lymphoma and embryonal carcinoma) degenerated spontaneously and one (piloid cerebellar astrocytoma) showed occasional nuclear lesions. Studies of their DNA buoyant density distinguished the isolated viruses from oncogenic types. Immunologic studies showed no viral antigen in the tumor cells, nor did electron micrographs show any viral particles. Hence, the adenovirus recovered from these tissues could be either passenger viruses or laboratory contaminants.

65-307 CHROMOSOME ABNORMALITIES IN VITRO IN HUMAN LEUKOCYTES ASSOCIATED WITH SCHMIDT-RUPPIN ROUS SARCOMA VIRUS. (E.)

Nichols, W. W. (So. Jersey Med. Res. Found., Camden, N. J.), A. Levan, L. L. Coriell, H. Goldner and C. G. Ahlstrom. Science 146:248-250, 1964.

Cultures of human leukocytes exposed in vitro to suspensions of Schmidt-Ruppin Rous sarcoma virus at 36 hr. (after onset of DNA synthesis) showed mitotic inhibition and chromosome abnormalities, in the form of chromatid breaks at metaphase when colchicine was added, and bridges and fragments at anaphase (without colchicine). When the virus suspension was added at the time the cultures were established, severe mitotic inhibition prevented chromosome analysis. Similar cultures exposed to the Bryan strain of Rous sarcoma virus (non-tumorigenic in mammals) produced some mitotic inhibition but no significant chromosome breakage. (See also CRA 1(5):#942, 1963.)

65-308 OBSERVATION OF HeLa/HA2 DURING THE FORMATION OF CLONES. (Jap., Abstract)

Miyamoto, T. (Dept. Bact., Tohoku U., Japan), Y. Hinuma and N. Ishida. Birusu (Virus) 13(5-6): 225-227, 1963.

In order to investigate the activity of virus antigen in continuously infected HeLa (HeLa/HA2) cells, the cells of a HeLa/HA2 clone (obtained after an 8 day culture in 20% non-heated cow serum medium with Eagle's MEM under CO₂ at pH 7.2 at 37°C) were tested for virus antigen activity by means of a fluorescent antibody (FA) technic and a guinea pig RBC adsorption technic. All HeLa/HA2 cells (860/860) tested by the FA technic were positive for virus antigen, while 1183/1337 tested by the adsorption technic were positive. Those which gave negative results by the latter technic, nevertheless, were positive by the subsequent FA technic. The members of a HeLa clone, on the other hand, were negative by either technic except for occasional atypical positives. Cultivation together in the same medium of both HeLa/HA2 and HeLa cells did not alter these basic findings. Furthermore, the addition of 1% anti-HVJ rabbit serum to the culture medium (sufficient antibody was present to neutralize the HA2 antigen) during the cultivation of HeLa/HA2 cells, again did not alter the basic findings. These results, indicate that the virus antigen originally existing in the parental cell of the clone is carried over in each cell of the clone, along with the virus itself.

65-309 CHROMOSOME ABERRATIONS: THEIR ROLE IN THE ETIOLOGY OF MURINE LEUKEMIA. (E.)

Rich, M. A. (Albert Einstein Med. Ctr., Philadelphia, Pa.), R. Tsuchida and R. Siegler. Science 146:252-253, 1964.

In newborn Swiss HalCR mice inoc. with 0.05 ml of a murine leukemogenic virus (see CRA 2(7):#1332,

1964) the incidence of aneuploidy (number of aneuploid cells/number of cells examined) during various stages of leukemogenesis in the right and left thymus was, resp.: animals with no pathologic changes, 2/181 and 2/159; animals with unilateral thymus depletion (pre-lymphoma), 0/73 and 3/65; animals with unilateral lymphoma, 2/87 and 52/149; and animals with generalized lymphoma, 64/283 and 54/209. The sparsity of aneuploidy in pre- and early leukemia compared to the high incidence in disseminated lymphoma indicates that chromosome aneuploidy accompanying viral murine leukemia is a consequence, not a cause, of neoplastic transformation.

65-310 ONCOGENICITY OF A VARIANT OF ROUS SARCOMA VIRUS, THE 14(d)7 STRAIN, IN CHICKENS AND DUCKS. (E.) Kuwata, T. (Dept. Bact., Chiba U. Sch. Med., Japan). Arch. Ges. Virusforsch 14(5):628-636, 1964.

The duck-adapted variant strain 14(d)7 of the Rous sarcoma virus (RSV) was oncogenic in both chickens or ducks after growing in either species. Attempts to obtain viruses which are oncogenic only in chickens or ducks (by passing viruses in one of these birds) have failed. Heat-inactivated 14(d)7 virus had no influence upon oncogenicity of RSV, and no transformation nor reactivation phenomena were observed.

65-311 PAPOVAVIRUS SV40: FAILURE TO ISOLATE INFECTIOUS VIRUS FROM TRANSFORMED HAMSTER CELLS SYNTHESIZING SV40-INDUCED ANTIGENS. (E.) Melnick, J. L. (Dept. Virol. Epidemiol., Baylor U. Coll. Med., Houston, Tex.), K. S. Khera and F. Rapp. Virology 23(3):430-432, 1964.

The presence of papovavirus SV40 was not demonstrated in experiments with transformed hamster cells 2X-10 (embryonic cells, initially inoc. with SV40) and H-50 (derived from a virus-free tumor line induced by SV40); disrupted 2X-10 and H-50 cells inoc. with GMK (primary green monkey kidney cells) or BSC-1 (derived from green monkey) cells; intact 2X-10 and H-50 cells plated onto sensitive BSC-1 monolayers; tumor extracts and intact cells (from hamsters inj. with H-50 cells 2 mo. prior) and seeded on BSC-1 cultures; transformed cell lines exposed to streptonigrin in vivo and in vitro. The presence, in these experiments, of neutralizing antibodies or inhibitors of SV40 was considered unlikely. Results suggest that transformation of cells by SV40 and production of new cellular antigen can take place without conferring the capacity to synthesize infectious virus; failure to detect infectious virus in a cell in which new antigens are being produced as a consequence of virus infection suggests the possibility that only part of the viral genome has integrated with the genome of the cell. (See also CRA 2(4):#729, 1964 and the following abstract).

312 VIRUS-INDUCED INTRANUCLEAR ANTIGEN IN CELLS TRANSFORMED BY PAPOVAVIRUS SV40.

(E.) Rapp, F. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.), J. S. Butel and J. L. Melnick. Proc. Soc. Exp. Biol. Med. 116(4): 1113-1135, 1964.

Antibodies from hamsters bearing large virus-free tumors induced by hamster cells transformed by papovavirus SV40 in vitro (2X-10 line) or in vivo (50 line), or by human embryonic cells (X-10 line) transformed by SV40, were found to contain circulating antibodies capable of reacting with intranuclear antigens synthesized by SV40-transformed cells. The reaction was particulate and did not involve the nucleolus. Immunofluorescent techniques demonstrated the presence of the SV40-induced antigen in all cells of the SV40-transformed cultures. Serum from hamsters without a tumor, from normal hamsters and from hamsters immunized with liver SV40 and proven to be resistant to the SV40-transformed cells failed to react with the antigen. The presence of new cellular antigens following transformation of cells by papovaviruses is indicative of the integration of at least part of the viral genome with that of the host cell. Attempts are now under way to determine whether the SV40-induced antigens are viral precursors or "new" cellular antigens. (See also the preceding abstract.)

313 HOST-VIRUS RELATIONSHIPS IN HAMSTERS INOCULATED WITH SV40 VIRUS DURING THE NATAL PERIOD.

(E.) Girardi, A. J. (Merck Inst. Therap. Res., West Point, Pa.) and M. R. Coleman. Proc. Soc. Exp. Biol. Med. 116(3): 717-728, 1964.

Newborn hamsters inoc. s.c. with SV40 virus showed a gradual and progressive diminution in detectable viral content during the first 3 wk. following inoc. No virus was found at 130-200 days in non-tumor-bearing animals, a time when tumors had begun to appear in littermates. Virus is commonly, but not always, present in tumors even though the agent was not demonstrable during the preceding period; the presence of virus appeared not to be essential for the retention of oncogenic properties. The quantity of virus was greater in larger tumors. When hamsters were inoc. as above at 0, 7, 14 or 21 days of age, virus was detected in the whole animal or in the carcass at 7 but not at 14 days following inoc., regardless of age at inoc. Neutralizing antibody was absent 4 wk. after inoc. in animals given SV40 when newborn, but appeared in an increasing proportion of hamsters which were given virus at ages 7, 14 or 21 days. However, presence or absence of neutralizing antibody response to SV40 virus appeared to be unrelated to the subsequent development or failure to develop tumor.

314 ULTRAFILTRATION OF SIMIAN VIRUSES. (E.) Atoyntan, T. (Dept. Epidemiol., Yale U.

Sch. Med., New Haven, Conn.) and G. D. Hsiung. Proc. Soc. Exp. Biol. Med. 116(3):852-856, 1964.

By using millipore filters of 100, 50 and 10 μ pore sizes the authors were able to estimate the size of simian viruses and classify them into 3 size categories: large (SV5), medium (SV1, SV11, SV12, SV15, SV17, SV23, SV25, SV27, SV30, SV31, SV32, SV33, and SV36) and small (SV16, SV18, SV26, SV29, SV35, and SV40).

65-315 STUDY OF VIRULENCE AND TUMORIGENICITY OF VARIANTS OF HERPES SIMPLEX VIRUS.

(E.) Rapp, F. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.) and L. A. Falk. Proc. Soc. Exp. Biol. Med. 116(2):361-365, 1964.

A difference in virulence for both newborn Swiss mice and Syrian hamsters was demonstrated in 3 purified variants of the JES strain (the large-plaque-forming LPV XIII and the small-plaque-forming SPV 35 and SPV 38) of herpes simplex virus. The latter 2 variants were less virulent than LPV XIII. The i.p. inoc. of all variants led to a higher death rate than s.c. inoc. The variants could cause transplacental infection of hamster embryos but not of mouse embryos. No tumors were induced over a period of 6 mo. in newborn mice and hamsters inoc. with 10^5 PFU of the attenuated variants within 24 hr. after birth.

65-316 TUMOR IMMUNITY IN HAMSTERS INFECTED WITH ADENOVIRUS TYPE 12 OR SIMIAN VIRUS 40.

(E.) Eddy, B. E. (NIH, Bethesda), G. E. Grubbs and R. D. Young. Proc. Soc. Exp. Biol. Med. 117(2):575-579, 1964.

In a group of hamsters (<1 to 4 days old) inoc. s.c. with 0.2 ml of adenovirus type 12 diluted in 4-fold steps and then admin. undiluted homologous virus (1 ml 2x/wk. x 13) starting 11 to 15 days after the initial infection, only 8/50 (16%) developed neoplasms as compared with 32/37 in hamsters untreated but infected when newborn. The same treatment of hamsters infected neonatally with undiluted virus was effective in protecting only 6/10 animals. No tumors appeared in uninfected but treated hamsters. Similar results were obtained with SV40 virus. Larger doses of virus were in general more effective than smaller doses but protection was obtained over a range of virus doses. Virus heated to 50°C for 1 hr. in the presence of Mg Cl₂ was not effective in preventing the induction of tumors. (See also CRA 1(6): #1121, 1963.)

65-317 INFLUENCE OF THYMECTOMY ON TUMOR INDUCTION BY POLYOMA VIRUS IN C57BL MICE.

(E.) Miller, J. F. A. P. (NCI, Bethesda), R. C. Ting and L. W. Law. Proc. Soc. Exp. Biol. Med. 116(2):323-327, 1964.

See CRA 2(7):#1225, 1964.

- 65-318 TRANSPLANT IMMUNITY TO POLYOMA VIRUS-INDUCED TUMORS. II. EVIDENCE FOR HOST-DEPENDENT IMMUNOGENIC VARIATION OF POLYOMA VIRUS. (E.) Hare, J. D. (Dept. Microbiol., U. Rochester Sch. Med., N. Y.). Proc. Soc. Exp. Biol. Med. 117(2):598-603, 1964.

The ability of polyoma virus (PV) strain 3049 (which replicates in mouse cells) to stimulate immunity in adult hamsters against tumors induced by the same virus was significantly increased by passing the immunizing virus once in hamster embryo cells for 4-7 days. The higher immunogenic capacity was lost when PV derived from hamster cells was allowed to proliferate in mouse cells again. These results suggest that a host-controlled modification of PV may have taken place during its replication in hamster cells. (See also CRA 1(1):#103; and ibid., (5):#924, 1963.)

- 65-319 STUDIES IN ROUS RAT SARCOMA WITH FLUORESCENT ANTIBODIES. (E.) Lindberg, L. G. (Inst. Path., U. Lund, Sweden). Acta Path. Microbiol. Scand. 61(2):318-319, 1964.

Cells of Rous virus-induced rat (RR) sarcoma, suspended in ascitic fluid were incub. with specific immune serum against Rous virus (Schmidt-Ruppin strain) from chickens (which were immunized with attenuated or inactivated virus fraction), then re-incubated with fluorescein-labeled rabbit antibodies against chicken gamma globulin. On day 9 following i.p. inj. of RR-sarcoma, the per cent fluorescent cells was 21.1 and 15.2 in the ascitic fluid after treatment with 1:3 and 1:6 immune serum, 1.2 and 1.7 with 1:3 and 1:6 absorbed serum, 1.7-1.8 with control serum; on day 7, per cent was 27.0 and 15.0 with 1:3 and 1:6 immune serum, 1.8 and 4.2 with 1:3 and 1:6 anti-rabbit albumin serum; 2.5 in controls. About 20% of the RR sarcoma cells showed in their cell membranes some substance that reacts to antibodies from the immunized chickens. The fluorescence appeared as a homogeneous rim on the entire periphery of the cells, only rarely as granules

on the cell membrane. This fluorescence may not be related to virus particles but to tumor-specific antigens. These findings differ from those of others, where fluorescent aggregates were found in the cytoplasm of virus-infected fibroblasts.

- 65-320 INDUCTION OF NEOPLASMS IN SALIVARY GLAND RUDIMENTS RECOVERED FROM FROZEN STORAGE. (E.) Dawe, C. J. (NCI, Bethesda), M. S. Slatick, W. D. Morgan and E. Hensley. Proc. Soc. Exp. Biol. Med. 116(1):149-153, 1964.

Submandibular salivary gland rudiments dissected from 13- and 14-day embryo mice of strain C3H/Bi were able to survive slow-freezing and storing in a 5% glycerol-medium at -150°C. The development of the rudiments after thawing was less rapid and less extensive than with fresh rudiments, but their ability to form tumors after infection with polyoma virus and subsequent transplant into isologous hosts was not appreciably damaged. See also CRA 1(5):#938; and ibid., (6):#1149, 1963.

- 65-321 THE TRANSFORMING AND MITOGENIC ACTIVITY OF ADENOVIRUS PREPARATIONS ON LEUKOCYTES CULTURED IN VITRO. (Fr.) Fauconnier, B. (Dept. Virus, Pasteur Inst., Paris). C. R. Acad. Sci. (Paris) 259(1)(Group 13):243-245, 1964.

In experiments performed with cultures of human leukocytes taken from 15 subjects of both sexes and with various blood groups, it was shown that infection of the cultures with preparations of adenovirus types 3, 5 and 12 (propagated in KB cells) induced the transformation of leukocytes into cells of lymphoblastic appearance capable of mitotic division. The lymphoblastic response was noted only in the leukocytes of 2/15; in one subject (O group, RH negative) it was more marked than in the other. The inducing factor was not destroyed by heating at 100°C for 10 min. The lymphoblastic transformation was not observed in the presence of viral culture suspension medium or non-infected KB cell preparations.

See also abstract nos.: 237,360,362,386,387

EPIDEMIOLOGY AND BIOMETRY

- 65-322 ENVIRONMENTAL CARCINOGENESIS. (E.)
Kotin, P. (NCI, Bethesda). Trans. Coll. Physicians Phila. 32(2):64-68, 1964.

Since the past accumulation of myriads of data on cancer has not been paralleled by a concomitant narrowing of the gap of extrapolation of experimental data to man, a need exists for experimental design utilizing all of the tools of environmental carcinogenesis which can thus complement the basic laboratory approach. It is only in rare situations that carcinogenic hazards have been obviously identified and pursued further in laboratory studies. Less overt carcinogenic influences are essentially unknown and cancers of cryptic (sometimes erroneously called "spontaneous") origin may constitute the majority. After a brief review of known carcinogens and analysis of their heterogeneity, attention is drawn to needed environmental, epidemiological and demographic studies which can help elucidate basic problems.

- 65-323 TESTICULAR TUMOURS. (E.) Sandeman, T. F. (Peter MacCallum Clin., Melbourne, Australia). J. Coll. Radiol. Aust. 8(2):134-151, 1964.

Among 200 testicular neoplasms seen in Melbourne between 1930 and 1962 (128 seminomas, 63 teratomas, 3 chorionepitheliomas, 1 lymphosarcoma, and 5 undiagnosed), 62.5% of cases presented at age 21-40 yr. Cryptorchidism was present in at least 21/200 (10.5%). Most recurrences and metastases occurred within 2 yr. of orchiectomy. Metastases to the central nervous system and bones were as common as to the supraclavicular nodes.

- 65-324 CANCER AND ITS DISTRIBUTION IN INDIA. (E.) Paymaster, J. C. (Tata Mem. Hosp., Parel, Bombay, India). Cancer 17(8):1026-1034, 1964.

Preliminary investigations indicate the incidence of cancer in India to be about 85/100,000 of population. The distribution of malignant neoplasms in India is diagrammatically contrasted to that in Japan, Scandinavian countries, USSR, United Kingdom, and U.S. In India, the percentage incidence of cancer by site was: oral cavity and pharynx, 34.9%; female genitalia, 22.1%; digestive tract (other than oropharyngeal), 10.2%; breast, 7.4%; male genitalia, 4.0%; respiratory organs, 1.6%; other sites, 19.8%. Distribution of various sites of cancer in different parts of India is also diagrammed, showing marked, but often unexplainable differences. The distribution of mammary and cervical cancer in women of different religious groups and communities also showed great variations. Among a total of 922 cases-observed, it seemed that circumcision performed very early in life protected the individual against the occurrence of cancer of the penis. A striking preponderance of Ewing's sarcoma was noted in Bombay,

whereas it was uncommon in other parts of the country. Among 498 of malignant neoplasms in infancy and childhood seen at Tata Memorial hospital, 48% were malignant lymphomas, 38% were bone sarcomas, 10% soft tissue sarcomas, 3% orbital sarcomas, and 43% others (retinoblastoma, neuroblastoma, Wilm's tumor, and malignant epithelial tumors). It was concluded that a large proportion of cancer in India occurs in the easily accessible regions (such as the oral cavity, pharynx, breast, and cervix), and that some types of cancer are associated with the habits, customs, and other exogenous factors pertaining to a particular population. (See also CRA 1(3):#524, 1963.)

- 65-325 MALIGNANT MELANOMA AND PREGNANCY. REPORT OF 3 CASES. (E.) Conybeare, R. C. (756 Pipestone, Benton Harbor, Mich.). Obstet. Gynec. 24(3):451-454, 1964.

A 39-year-old woman developed a malignant melanoma during her first pregnancy. She delivered a normal child but died of metastasis 8 mo. after delivery. A 28-year-old woman, who had had one pregnancy 2 yr. before she developed a malignant melanoma, subsequently bore one normal child and had 3 spontaneous abortions before her disease recurred in the gall bladder. A 24-year-old woman, who had had 2 children previously, delivered a normal child 3 yr. after excision of a malignant melanoma; she died 1.5 yr. later of disseminated metastatic melanoma.

- 65-326 LEUKEMIAS ARISING DURING THE PERIOD 1946-1961 AMONG INDIVIDUALS EXPOSED TO THE ATOM BOMB EXPLOSION IN HIROSHIMA. (Jap.) Watanabe, S. (A-bomb Res. Inst., Hiroshima U., Japan), F. Hirose and S. Takizawa. Nagasaki Igakkai Zasshi (Nagasaki Med. J.) 38 (Suppl.): 162-165, 1963.

An analysis of the incidence of leukemias during the 1946-1961 period among those exposed to the atomic bomb explosion at a distance of less than 5,000 m revealed that the incidence, after it hit the peak during the period 1951-1953 (17, or 17.37/10⁵, as compared with 20, or 6.72/10⁵ among the general public in 1951), had gradually and slightly been dropping except for the transitory rise in 1959 (15, or 16.68/10⁵ as compared with 25, or 5.86/10⁵ among the general public), reaching 10, or 10.48/10⁵ as compared with 20, or 4.35/10⁵ among the general public in 1961. The acute leukemia incidence during the first 8 yr. and that during the latter 8 yr. were 48 and 54 cases, resp., while the chronic leukemia incidences during the two periods were 35 and 37 cases, resp.; these figures reveal no particular trend. The incidence of leukemias was particularly high (146 cases, i.e., 82 acute and 64 chronic) among those exposed at a distance of less than 2,000 m, as compared with that of those exposed at distances between 2,001-5,000 m (28 cases, i.e., 20 acute and 8

chronic). The incidence of leukemia among those who entered the city after the atomic bomb explosion reached its peak during the period 1957-1959. During the 16-yr. period, the incidences of leukemia among those entering the city less than 3 days, less than 1 wk., and less than 2 wk. were 25, 30 and 35 cases, resp., or rates (per 100,000) of 8.08, 6.79, and 6.61, resp. These incidences were all significantly higher than those among the general public in Japan.

- 65-327 CYSTIC DISEASE OF THE BREAST: RELATIONSHIP TO CARCINOMA. (E.) Davis, H. H. (734 Doctors Bldg., Omaha, Nebr.), M. Simons and J. B. Davis. Cancer 17(8):957-978, 1964.

Among 284 women who underwent local excision of a mammary cyst(s), 7 (2.5%) developed carcinoma within 14 yr. This is 1.73 times the expected incidence in the whole female population of comparable age (although the figure based on a review of world literature was 2.64 times). Intraductal hyperplasia was found in 86/284 (30.3%), carcinoma in 3/86 (3.5%). No hyperplasia was found in 176/284 (62%), and 3/176 (1.7%) developed carcinoma. Carcinoma developed in 6.2% of pts. with solid hyperplasia and in only 3.8% of those with papillomatosis. Among 327 specimens from mastectomies, cysts accompanied the carcinoma in 128 cases (39.1%). This association was most common in comedocarcinoma and in papillary carcinoma cases. In true scirrhous carcinoma, cystic disease was found only about half as frequently. Two peaks in carcinoma frequency occurred: at age 40-50 (predominantly comedocarcinoma), and at age 60-65 (mainly scirrhous carcinoma). It was concluded that women with mammary cysts are somewhat more likely to develop mammary carcinoma than women in general, but a unilateral simple mastectomy would not be justified since more than 50% of the cystic disease pts. develop recurrences in the opposite breast, and nearly 50% of the carcinomas occur in the opposite breast. An extensive clinical and statistical review of world literature (129 references) is included.

- 65-328 CANCER RESEARCH. (E.) Wallace, D. Lancet 2:365, 1964.

In rebuttal to the statement made in 1961 by the British Association of Urological Surgeons Subcommittee that all risks of bladder carcinoma had been removed in 1949, the author notes that benzidine was used in the rubber industry until 1956. Benzidine is still sold in England, as are large quantities of imported antioxidants containing α -naphthylamine. Social interviews of all new bladder-tumor pts. at Royal Marsden Hospital has uncovered a surprising number (no details) of cases among rubber and cable workers which were undetected by responsible personnel at places of employment. Bladder cancer among rubber workers appears on the increase and all

rubber-using industries, including the cable industry should be investigated without further delay. (See also CRA 2(5):#827, 1964.)

- 65-329 CARCINOMA OF THE THYROID IN MYXOEDEMA. (E.) Sclaire, G. (Dept. Path., Crumpsall Hosp., Manchester, England) and A. Nicol. J. Clin. Path. 17(4):438-443, 1964.

Three cases are reported of primary thyroid cancer (invasive adenocarcinoma, spheroidal-cell carcinoma and papillary adenocarcinoma) discovered in a postmortem study of 37 female pts. with myxedema (age 64-70 yr.) none of whom had shown any clinical manifestations of cancer. All three thyroid glands showed, in addition to their malignancies, other histologically similar epithelial abnormalities, which while not malignant might possibly be considered transitional in character.

- 65-330 THE TASK OF PHTHISIOLOGISTS IN THE TIMELY DIAGNOSIS OF LUNG CANCER. (Ger.) Boleček (Acad. Sci., Liberec, Czech.). Zschr. Tuberk 122(1-4):236-238, 1964.

In a paper on the importance of early diagnosis for the favorable outcome of treatment of lung cancer, the following statistics for the Czechoslovak Republic are reported: deaths from lung cancer (per 100,000) have increased steadily from 15 in 1952 to 34 in 1962, as in other industrial countries, while the rate for tuberculosis decreased from 63 to 24/100,000 in the same period. The increase in lung cancer is due largely to its increased incidence in males (from 25 to 57); the incidence in females rose only from 5 to 7. The number of deaths from lung cancer increased relatively to the total number of deaths from cancer from 10% in 1952 to 17.8% in 1962.

- 65-331 SMOKING AND LUNG CANCER. (E.) Berkson, J. (Mayo Clin., Rochester, Minn.). Med. Proc. (Johannesb.) 10(16):327-336, 1964.

In a discussion of smoking and lung cancer, recent statistical findings linking lung cancer to cigarette smoking are analyzed and interpreted statistically, throwing considerable doubt on their widely assumed causal relationship. Some conclusions follow: of excess deaths among cigarette smokers, only 10-15% were due to lung cancer; the population sample may not be representative (obtained by questionnaire); there is evidence that smokers are of a certain "constitutional type", which introduces a factor of proneness to or resistance to disease. The author noted that the rising rates of lung cancer deaths involve improved recognition and diagnosis and they may be due also to increasing longevity of the population. It was noted that the theory that lung cancer is caused by carcinogens in the cigarette smoke has almost been abandoned.

- 65-332 SMOKING, MORTALITY AND DISABLEMENT IN THE NETHERLANDS. (E.) Van Voorst Vader, P. J. A. Med. Officer 112(11):153-155, 1964.

While the mortality rate (per 10,000) of women in The Netherlands declined from 72.3 in 1950 to 70.7 in 1962, the mortality of men increased from 77.2 to 87.8; the increase in male mortality was restricted to the 50-69 yr. age group. This increase was due chiefly to coronary artery disease, lung cancer, and other respiratory diseases (chronic bronchitis). Cases of disability pension claims also rose sharply for males during this period, because of these diseases. During these years the per capita consumption of tobacco increased in The Netherlands from 65 to 94 cigars, 13-27 cigarillos and from 793 to 1,287 cigarettes, or to an estimated 1,900 cigarettes including those made by the smoker itself. Combining the known mortality rates for smokers and non-smokers with Dutch smoking habits (women smoke little), it is concluded that the excess mortality of The Netherlands males over females between ages 50-69 is due very largely to smoking.

- 65-333 CANCER RESEARCH. (E.) Boyland, E. (Chester Beatty Res. Inst., London, S.W.3) and A. Haddow. Lancet 2:527, 1964.

In this letter to the editor the author rejects the implication of Dr. Parkes (a previous letter) that aldol-1-naphthylamine which no longer contains 2-naphthylamine, now used in the rubber industry, is unlikely to be carcinogenic. This and other substances such as 1-naphthylamine (NA) must still be considered a potential hazard to man, particularly as carcinogenic metabolites of NA have been detected in the urine. Although the known carcinogen 2-naphthylamine is no longer manufactured in most countries, the occurrence of cancer in the rubber industry should be impartially investigated. (See also CRA 1(12):#2045, 1964.)

- 65-334 INVESTIGATIONS OF HERITABILITY OF CANCER. FOLLOW-UP STUDIES OF AN UNSELECTED SERIES OF TWINS OF v. VERSCHUER AND KOBER. (Ger.) Spranger, J. (Inst. Human Genet., U. Munster, Germany) and O. Von Verschuer. Zschr. Krebsforsch. 66(3):549-571, 1964.

A study of 89 pairs of twins among whom 1 partner had had cancer 25 yr. previously is presented in detail, brought up to date, and evaluated. The general concordance in tumor incidence of monozygotic twins (MT) did not tend to be any higher than that of dizygotic twins (DT); however, the specific concordance in tumor location of MT was more than double that of DT. This was particularly evident with gastric carcinoma (4/7 MT pairs, 2/15 DT pairs studied). A statistical evaluation of literature (43 references) including 1117 twins is included with tabulations on presence or absence of concordance in tumor localization. Again, no marked difference between the

general incidence of tumor in MT as compared to that in DT was evident, but the specific concordance of similar tumors in MT was 13.8% as compared to only 2.6% in DT. The concordance in location and tumor type among MT was again particularly high in gastric carcinoma (30% in MT versus only 4.2% in DT of the same sex and 9.1% in DT of the opposite sex). A similar tendency was evident for all tumors, except for bronchial carcinoma which did not seem to have a genetic organ-disposition.

- 65-335 EPIDEMIOLOGY OF CARCINOMA. PART II. CANCER MORTALITY IN THE AUSTRIAN FEDERAL COUNTIES. (Ger.) Denk, W. (Austria. Inst. Cancer Res., Vienna), H. Hansluka and K. Karrer. Zschr. Krebsforsch. 66(3):225-249, 1964.

Differences in cancer mortality were tabulated for various regions in Austria during 3 different periods (1939-41, 1952-54 and 1959-61). Differences in the level of health care obscured the real regional differences. A significantly higher mortality among men of all ages was evident, however, in Vienna (for all 3 periods). (See also CRA 1(6):#1200; and ibid., (8):#1597, 1963.)

- 65-336 LYMPHOMA SYNDROME IN NORTHERN NIGERIA. (E.) Berry, C. G. (Regional Path. Lab., Kaduna, N. Nigeria). Brit. Med. J. 2:668-670, 1964.

Of 296 malignant tumors diagnosed among pts. of all ages during 1963-64 at the Kaduna Regional Laboratory in Northern Nigeria, the most common were malignant skin lesions (68 cases, 22.9%); malignant lymphoma was second (58, 19.8%). Among children up to 15 yr., there were 35 malignant neoplasms, the most frequent being the malignant lymphoma syndrome (Burkitt's tumor), with 17 cases (48.6%), followed by 6 other lymphomas. All these cases occurred in residents of the more southerly part of Northern Nigeria, where temperature and rainfall and mean relative humidity are higher than in the northern part of the region. The still higher incidence of Burkitt's tumor previously reported from the still warmer and moister south (Ibadan, 70%) suggests that a cool dry climate does not favor this syndrome. However, the lower incidence from the north may merely reflect an "under doctored" area.

- 65-337 LUNG CANCER AND MONTH OF BIRTH. (E.) De Sauvage Nolting, W. J. J. (Zeist, The Netherlands). Lancet 2:531, 1964.

Among 15,091 cases of cancer (of which one-third were lung cancer), the cancer rate was lower than the over-all rate in those born between May and August inclusive, and higher than the over-all rate for those born between November and April inclusive. Allowing for seasonal variations in the general population birth rate, and for seasonal fluctuations in infant mortality, the birth month

differences were still evident. (See also CRA 3(1):#172, 1965.)

- 65-338 THE INCIDENCE OF BENIGN PROSTATIC HYPERPLASIA AND PROSTATIC CARCINOMAS IN CIRRHOSIS OF THE LIVER. (E.) Robson, M. C. (Dept. Surg., U. Chicago Hosp. Clin., Ill.). *J. Urol.* 92(4):307-310, 1964.

Of 2,432 autopsies performed on men aged 50 or older from 1946-60, 30.1% had benign prostatic hyperplasia and 11.3% had prostatic carcinoma; and the resp. incidence in those 205/2432 with cirrhosis was 25.4% and 8.3% which was not significantly different from those without cirrhosis (30.5% and 11.7%, resp.). A more detailed study of 149/205 showed a lesser incidence of prostatic carcinoma in men with severe cirrhosis, but this may be attributable to the earlier death of severely cirrhotic pts. This was not true for benign prostatic hyperplasia. Cirrhotics with hyperestrogenism did not have a decreased incidence of cancer or benign prostatic hyperplasia.

- 65-339 MALIGNANT TUMORS IN HIGH ALTITUDE PEOPLE. (E.) Krüger P., H. (Dept. Path., Peruvian U. Med. Biol. Sci., Lima) and J. Arias-Stella. *Cancer* 17(10):1340-1347, 1964.

In a stable population of 20,000 Peruvian Indians and mestizos residing at altitudes of 11,500-14,300 feet, 20 cases of malignant tumor were collected during 1961 and 1962 from pts. aged 8-80 yr.; all were histologically verified. These included cervical carcinoma (5), gallbladder and gastric adenocarcinoma (6; some with metastases), facial carcinoma (1), ovarian carcinoma (1), mammary carcinoma (1), malignant melanoma (3), retinoblastoma (1), and reticulum cell sarcoma (2). These studies indicate, contrary to past speculations, that malignant neoplasms do indeed occur in natives of high altitude zones of the Peruvian Andes. The physical environment (temperature, humidity, O₂ pressure), the anthropological characteristics of the natives, nutritional conditions, and certain living habits have no apparent influence over the pathological process.

- 65-340 STATISTICAL INVESTIGATIONS ON BRONCHIAL CARCINOMA IN NORTH RHINE-WESTPHALIA. (Ger.) Poche, R. (Inst. Path., Med. Acad. Dusseldorf, Germany), O. Mittmann and O. Kneller. *Zschr. Krebsforsch.* 66(3):250-262, 1964.

A more detailed account of the paper published as CRA 1(3):528, 1963.

- 65-341 CAN TUMOURS BE TRANSMITTED BY INSECTS? (E.) Burkitt, D. (Dept. Surg., Makerere U. Coll. Sch. Med., Kampala, Uganda). *Triangle* 6(6):222-226, 1964.

A description of the African lymphoma seen in children, including material previously reported in CRA 1(3):#467, 1963, *ibid.*, (12):#2187, 1964, and *ibid.*, 2(3):#410 and #411, 1964.

- 65-342 GEOGRAPHIC VARIATION IN THE INCIDENCE OF ESOPHAGEAL CANCER. (E.) Mason, M. J. (NCI, Bethesda), J. C. Bailar III and H. Eisenberg. *J. Chronic Dis.* 17(8):667-676, 1964.

Data from the tumor registry of the Connecticut State Dept. of Health showed that the incidence of esophageal cancer (1807 cases in 1935-1956) varied according to urbanization and population conc. The crude rate (per 100,000) for the State was 7.24 for males and 1.52 for females. The rural incidence ratio (incidence of observed compared to the expected number for age-sex-specific population) was 0.81, the urban ratio was 1.11. In all areas, incidence increased fairly regularly with population density. Towns with populations per square mile of 0-99 persons showed a ratio of 0.62; 100-199, 0.72; 200-499, 0.82; 500-999, 0.93; 1000-4,999, 1.03; and 5000 and over, 1.30. A grouping of towns by their degree and type of industrialization brought no reliable evidence of any relationship to incidence of esophageal cancer, beyond the correlation with population density. This pattern differed from that of cancer of the uterine cervix and uterine corpus which was not correlated with either industrialization or population density.

- 65-343 A CLINICAL AND HISTOLOGICAL STUDY OF LINGUAL CANCER. I. CLINICAL AND STATISTICAL STUDY ON 65 CASES OF LINGUAL CANCER. (Jap.) Goto, T. (Dept. Otorhinolaryng., Nagasaki U. Sch. Med., Japan), K. Yanagino, M. Higuchi and S. Eguchi. *Nippon Jibiinkoka Gakkai Kaiho (J. Otorhinolaryng. Soc. Japan)* 67(4):621-630, 1964.

Clinical and histologic studies were conducted in 65 cases of lingual cancer from 1952-1963. The incidence of cancer of the tongue (as compared to all cancers) for 1957-9 was 1-1.5% for the city of Nagasaki; for Japan for 1950-58 it was 0.5%. In Nagasaki, most were in the 40-60 yr. age range; 73.9% occurred in males, 26.1% in females. Tumors were localized in the body of the tongue (particularly the edge) in 91% and in only 4/65 cases at the root. Histologically, squamous cell carcinomas were found in 64/65 cases. Poor dental condition was the most frequent (86.1%) etiological factor encountered.

- 65-344 THE INCIDENCE OF CARCINOMA OF THE THYROID WHICH DEVELOPED FOLLOWING EXPOSURE TO THE ATOMIC BOMB EXPLOSION IN HIROSHIMA AND CLINICAL AND HISTOPATHOLOGICAL CHARACTERISTICS OF THE TUMOR. (Jap., Abstract) Ezaki, H. (Dept. Surg., Hiroshima U. Sch. Med., Japan), A. Ishida, T. Shigemitsu, H. Murakami and A. Fukuma. *Nippon Geka Gakkai Zasshi (J. Jap. Surg. Soc.)* 65(2):89, 1964.

analysis of a total of 12,088 pts. (1,132 exposed to atomic irradiation (no details) and 9,956 not exposed) who visited the surgical departments of either the U. of Hiroshima Hosp. or the Inst. of Atomic Medicine during the 1957-1962 period indicated that the incidence of carcinoma of the thyroid was, resp., 2.4% and 0.45%; the difference was statistically significant. Comparison of the tumor incidence before 1959 (0.74%, 2/270) with that after 1960 (3.0%, or 26/862) indicated a significant increase after 1960 in both exposed and non-exposed pts. In exposed pts., 80% of all cases appeared in the fourth decade, indicating a younger age distribution than in non-exposed pts. Exposure during the second decade subsequently contributed to the highest tumor incidence. The latent period was in most cases 12 yr. An analysis of a total of 184,571 members of the National Health Insurance Program (during the period 1960-1961) showed the tumor incidence among those exposed to be 0.00156% as compared to 0.00041% among those not exposed, again a significantly higher tumor incidence. Histopathological studies failed to differentiate radiation-induced carcinoma of the thyroid from non-radiation-induced carcinoma of the thyroid.

345 CLINICAL ASPECTS OF CHRONIC ULCER OF THE STOMACH OBSERVATION WITH THE VIEW OF PRECANCEROUS DISEASE STATE OF GASTRIC CARCINOMA. (Jap.) Wada, T. (Cancer Inst., Sapporo 11. Med., Japan), M. Fukuda, J. Ibayashi and T. Hayashida. Gan No Rinsho (Jap. J. Cancer Clin.) 10(8):600-606, 1964.

a total of 129 Oriental pts. (105 males and 23 females) with chronic ulcer of the stomach of whom 10 had concurrent stomach carcinoma (2 with simple carcinoma and 4 with adenocarcinoma), an attempt was made to elucidate possible existing correlations. The male:female ratios in chronic ulcer and in those with concurrent carcinoma were both 1:1. Carcinoma was found more frequently in those who had had chronic ulcer for more than 10 yr. In all the 5 carcinoma pts., a radiologically proven niche was concurrently present on the stomach wall. None of the carcinoma pts. showed achlorhydria; hyperacidity was seen in 1, normal acidity in 3 and hypoacidity in 2. The age range was 30-70 yr.; sites were 2 in the body of the stomach, 2 in the cardia and 2 in the pylorus.

346 STATISTICS ON MALIGNANT LYMPHOMAS. (Jap.) Segi, M. (Dept. Public Health, Hiroshima U. Sch. Med., Japan). Saishin Igaku (Mod. Med., Osaka) 19(7):1788-1798, 1964.

Statistical analyses of death rates in major countries of the world for lymphosarcoma, reticulum cell sarcoma (RCS), Hodgkin's disease, reticulosarcoma and other primary malignancies of lymphatic tissue indicated that although the death rates from these diseases in Japan were significantly low, deaths due to lymphosarcoma and RCS

increased significantly during the 1950-1960 period. Deaths due to Hodgkin's disease were also increasing but the rate of increase was not as marked as in lymphosarcoma and RCS. Analysis of death rates due to Hodgkin's disease in terms of various age groups showed that while there was a mild peak in the neighborhood of 30 yr. of age in the USA and England there was no such peak in Japan.

65-347 MODERN TRENDS IN THE TREATMENT OF UTERINE CARCINOMA. (SPECIALLY IN CARCINOMA OF THE CERVIX UTERI). (E.) Kottmeier, H.-L. (Radium Inst., Stockholm, Sweden). Arq. Pat. 36(1-2):47-64, 1964.

In 1959, the Swedish Cancer Registry reported 888 new cases of cervical carcinoma and 637 of the endometrium, together constituting 15% of all female malignancies; the resp. incidence (per 100,000 population) was 24 and 17. Carcinoma *in situ* amounted to 195 cases that yr. In Sweden, cancer of the cervix is found most frequently between ages 35-65; the incidence has been increasing progressively among the populations of large cities, particularly among women from the lower socioeconomic levels. The number of previous pregnancies, sexual experiences and penile hygiene are extrinsic factors of etiological importance in cervical cancer.

65-348 FURTHER STUDIES ON THE GEOGRAPHIC DISTRIBUTION OF LEUKEMIAS IN THE CRACOW REGION. REPORT III. ANALYSIS OF THE RELATION OF THE ESTABLISHED INDICES OF LEUKEMIA INCIDENCE WITHIN THE ADMINISTRATIVE UNITS OF A REGION TO THE STRUCTURE OF THE POPULATION OF THESE UNITS IN REFERENCE TO SEX AND THE TYPE OF INHABITED ENVIRONMENT. (Pol.) Janicki, K. (3rd Clin. Intern. Dis., Acad. Med., Cracow, Poland). Pol. Arch. Med. Wewnet. 34(7):867-872, 1964.

Among 17 regions which showed marked differences in leukemia incidence, no correlation was found between these differences and the percentage of male population, or the percentage of rural population. Other ecologic factors must be responsible for these differences. (See also CRA 1(9-10): #1775, *ibid.*, 2(2):#374, *ibid.*, (3):#548, *ibid.*, (7):#1379, 1964; and *ibid.*, 3(1):#152, 1965.)

65-349 STATISTICAL OBSERVATIONS DURING THE PAST 5 YEARS OF THOSE WHO ENTERED HIROSHIMA WITHIN 3 DAYS OF THE BOMB BLAST AND WERE UNDER THE A-BOMB SURVIVORS MEDICAL CARE. (Jap.) Shimizu, K. (A-Bomb Res. Inst., Hiroshima U., Japan), M. Watanabe, S. Ito and O. Yamamoto. Nagasaki Igakkai Zasshi (Nagasaki Med. J.) 38(Suppl.):36-45, 1963.

A study was conducted during the period 1957-1961 of patients in various groups who entered Hiroshima at different times after the bomb blast: Group A,

1-3 days, 138 (60 males, 78 females); Group B, 4-7 days, 39 (10 males, 29 females); Group C, 8-12 days, 11 (6 males, 5 females). Cancer incidence in Group A was 5 lung cancer, 3 thyroid cancer, 1 hepatoma, 1 ovarian cancer and 3 leukemia; that in Group B, 2 leukemia; that in Group C, 1 ovarian cancer and 1 leukemia. The incidences of the malignant tumors (10/138, or 7.2%) and of leukemia (3/138, or 2.2%) in Group A were significantly higher than the corresponding incidences (57/2,058, or 2.8%, and 35/2,058, or 1.7%) among those exposed directly to the bomb. The incidence of the malignant tumors in Group A was significantly higher than that among the general pt. population in Japan. The 10 pts. with malignant tumors and the 3 pts. with leukemia in Group A all had entered areas within 1.0 km of the hypocenter. All these pts. except one with leukemia had manifested acute symptoms at an earlier time.

65-350 LEUKEMIA IN HUMANS FOLLOWING EXPOSURE TO IONIZING RADIATION. (Jap.) Brill, A. B. (Dept. Med., Atom Bomb Casualty Comm., Hiroshima, Japan), M. Tomonaga and R. M. Heyssel. Hiroshima Igaku (J. Hiroshima Med. Assn.) 17(6): 578-596, 1964.

Incidence (per million) of leukemia (studied between 1945-1958) for those exposed at 0-999 m, 1,000-1,499 m, and 1,500-1,999 m from the hypocenter was, resp.: for Hiroshima, 1,366, 308 and 42; for Nagasaki, 563, 530 and 68. No significantly higher incidence was noted in those exposed at more than 2,000 m in Hiroshima. In those exposed at 0-1,500 m, the actual incidence during 1950-1958 in Hiroshima was 33 as against the expected rate of 6.14; in Nagasaki, 15 as against 2.64. Again, at 0-1,500 m exposure, a significantly higher incidence (per 1,000,000) occurred in those who developed the acute radiation syndrome at the time of exposure compared to those who did not: 1,042 and 207, resp., in Hiroshima; 723 and 389 in Nagasaki. At 0-1,500 m exposure, the shortest latent period was approx. 18 mo. The highest incidence came approx. 5-7 yr. after exposure. Statistics supported the notion that men are more susceptible to leukemia following radiation exposure. In those exposed at 0-1,500 m and studied during 1950-1958, male and female incidence was, resp., 17 and 16 in Hiroshima, and 11 and 4 in Nagasaki. The nearly equal numbers of the two sexes in Hiroshima was judged due to relatively greater physical exposure of the females at the time of the bombing. A particularly high incidence occurred in those <10 yr. of age at the time of exposure and exposed at 0-1,500 m, 20 cases, or a rate of 673 in Hiroshima and Nagasaki during 1947-1958; as against 12, or a rate of 26 for the same age group but exposed at 1,500-9,999 m; or as against 4-17, or a rate of 344-482 for age groups older than 10, but exposed at 1,500 m. Incidences of individual types of leukemia in both cities during 1947-1958 at exposures of 0-1,500 m and

1,500-9,999 m were, resp., 130 and 16 for acute myeloid, 179 and 7 for chronic myeloid, 65 and 3 for acute lymphatic, and 261 and 27 for total acute leukemias. The striking features were a higher incidence of chronic myeloid leukemia in those exposed at short distances (168 among those <9 yr. old and exposed at 0-1,500 m) and an increased incidence of acute lymphatic leukemia in younger persons exposed at short distances (269 in those <9 yr. old and exposed at 0-1,500 m). Analysis of the relationship between leukemia incidence and the amount of exposure radiation indicated that exposure to as small as 50-100 rad (air injection radiation amount) predisposes the individual to develop leukemia and that if the exposure amount exceeds 50-100 rad, there is a straight-line relationship between leukemia incidence and the amount of exposure.

65-351 PREVALENCE OF PEDIATRIC HEMATOLOGIC DISEASE IN JAPAN. (Jap.) Nakae, R. (Nagoya U., Japan). Rinsho Ketsueki (Jap. J. Clin. Hemat.) 4(2):171-177, 1963.

Among a total of 768 hospitalized pediatric cases of leukemia collected from over 40 hospitals throughout Japan during the period 1959-1962, the incidence of individual types of leukemia was: acute leukemia 712, monocytic leukemia 22, chronic leukemia 18, erythroleukemia 9, eosinophilic leukemia 1, other types 6. No basophilic leukemia occurred in this group. In relation to age there were two peaks: infancy and at about 5 yr. There is a serious lack of uniformity in the methods employed for the diagnosis of leukemia among participating hospitals.

65-352 ABO BLOOD GROUPS IN INTRACRANIAL TUMORS OF NEUROECTODERMAL ORIGIN. (It.) Iraci, G. (Inst. Neurosurg., U. Padua, Italy) and A. Carteri. Tumori 50(3):187-200, 1964.

A statistical analysis of ABO blood group distribution was carried out among 844 pts. with brain tumors of different histological type but with a common histoembryological origin from the neuroectoderma, who were operated upon for the first time at the Institute of Neurosurgery. The frequency (%) of blood groups O, B, AB, and A, resp., was 48.21, 7.15, 0, and 44.64 for 56 ependymomas; 38.09, 14.28, 6.35, and 41.27 for 63 oligodendroglioma; 45.13, 9.2, 2.83, and 42.83 for 565 astrocytomas; 28.26, 13.04, 0, and 58.65 for medulloblastomas; and 30.7, 6.14, 5.26 and 57.89 for 114 neurinomas (of the acoustic nerve). In 1000 controls comparative values were: 45.7, 9.3, 4.5 and 40.5. The predominance of medulloblastomas and neurinomas in subjects with A blood group was statistically highly significant.

65-353 CLINICAL AND STATISTICAL STUDY OF UTERINE CERVICAL CARCINOMA DURING ONE YEAR OF SERVICE. (Sp.) Andion Cal, O. (Dept.

ec., Nat. Inst. Oncol., Madrid, Spain). Rev. Oncol. 10:67-92, 1964.

ong 340 women with various gynecologic disorders under observation for a one-year period (1962-1963) at the Service of Oncologic Gynecology of the Institute, 193 (55.9%) were found to have cancer. In 131 cases the malignancy involved the uterine cervix, with the highest frequency observed in the age range of 51-60 yr.; 9.22% of the were nulliparous, 28.12% were multiparous and remaining had all had one or more deliveries. Other frequent cancer sites included the uterine amp, endometrium, vagina, ovaries, rectum and test.

354 A STATISTICAL STUDY (FROM 1947 TO 1962) OF TUMOR INCIDENCE IN AN INDUSTRIAL ZONE OF GENOA. (It.) Ravara, A. M. (Nat. Inst. Med. Care, Genoa, Italy). Pathologica 835-836:93-121, 1964.

Records of the I.N.A.M. (National Institute of Medical Care) section of Genova-Rivarolo (Italy) showed that the incidence of cancer (per 10,000 insured persons) in this zone had increased from 9 during the yr. 1947-1956 to 21.76 in 1957-1962, coinciding with its development as an industrial sector. The increase was more marked in men than women. The total number of cancers observed during this period was 1,150 of which 632 occurred in men and 518 in women. The highest frequency was observed in the age range 62-72. The highest increases in frequency from 1957 on was shown by cancer of the stomach, breast, lung, uterus and the genitalia; the incidence of these neoplasms was six times higher in 1962 than in 1947. However, the relative increment from yr. 1957 to 1962, resp., was higher for cancer of the respiratory system (7 and 23) than for cancer of the g.i. tract (27 and 58). The latter was ascribed to increased air pollution in connection with the construction of oil refineries in the zone.

65-355 A SURVEY OF THE GEOGRAPHIC DISTRIBUTION OF LEUKEMIC CHILDREN. (It.) Fischer, F. (Inst. Puericult., U. Rome). Arch. Ital. Pediat. 23(1):81-92, 1963.

Geographic distribution was studied in 100 leukemic children selected from 133 cases of leukemia (115 acute lymphatic, 13 myeloid, 2 monocytic, 3 hemocytoblastic) under observation during the period 1944-1958 at the Pediatrics Dept. of the University of Rome. Fifty-three cases came from Rome, 15 from the region of Latium (with the exclusion of the province of Rome) and 32 from provinces of central and southern Italy. In certain zones of Rome and in some provinces an apparent increase of frequency of childhood leukemia was observed as compared with other zones, but the evidence was not conclusive. Proximity and contact between children, more than geographic distribution, appeared to be a decisive factor. Incidence of childhood leukemia was higher in mountain areas than in the plains and hills, but further investigation with a larger number of cases is necessary.

65-356 OBSERVATIONS ON PREVIOUSLY ACQUIRED DISEASES OF LEUKEMIC CHILDREN. (It.) Fischer, F. (Inst. Puericult., U. Rome). Arch. Ital. Pediat. 23(2):146-162, 1963.

Examination of the case histories of 26 children with leukemia out of 143 cases under observation during the period 1944-1959 at the Pediatrics Dept. of the U. of Rome, revealed the following previous diseases: acute infectious disease 6; tuberculosis 6; bronchopneumonia 7; urticaria 3; infestations 2; trauma 3. A similar investigation was carried out on 28 cases of childhood leukemia reported in the literature (45 references). The author concludes that, with the exception of an apparent increased incidence of bronchopneumonia, leukemic children incur the same diseases as healthy children.

See also abstract nos.: 214,218

MISCELLANEOUS

- 65-357 BOUND WATER, METABOLITES AND GENETIC CONTINUITY. (E.) Webb, S. J. (Dept. Bact., U. Saskatchewan, Saskatoon, Canada). *Nature* (London) 203:374-377, 1964.

Production of amino acid dependent mutants of *E. coli* by desiccation and UV light depended on relative humidity. Both bound water and metabolites appeared to be involved both in preserving the viability of the cells and in preventing mutation. Inositol and cell metabolites prevented damage to those molecules which are concerned in protein synthesis. In a medium where sodium acetate or succinate was used instead of glucose, lactose negative (Lac-) mutants were produced on drying. Since glucose, lactose or inositol could prevent the appearance of these Lac- mutants, it was assumed that a combination between these additives and DNA prevented this particular mutation. Further experiments suggested that early protein synthesis was required for DNA replication in a normal cell. The delay in enzyme synthesis and DNA replication was apparently connected with the survival mechanism; this delay is evident only during the first 30 min. A definite amount of amino acid uptake and a small lactose uptake are necessary for DNA replication. When Swiss mice were inoc. with dried or non-dried normal spleen and thymus cells from young mice, after 12 mo. tumors occurred in 42% and 11%, resp. Most of the increase was due to leukemia. These results tend to support the hypothesis that bound water and some small molecules, with strategically placed groups, maintain biological integrity. It is suggested that the "operational" gene for enzyme production is a particular configuration on the outside of the DNA plus a metabolite; in the absence of the metabolite, the structural configuration is preserved by hydrogen-bonded water molecules (which can be replaced by inositol or similar compounds). If this particular DNA configuration is damaged by loss of water (desiccation or irradiation), the inner core will be affected when the 2 halves of the helix separate, and deformed daughter DNA will result. A scheme showing why protein synthesis is necessary for DNA replication is presented diagrammatically. DNA duplication relies on active protein synthesis, yet once started, the latter process can proceed without DNA. Metabolites act in combination with the gene, and in the presence of the metabolite the gene and cell are more stable. Presumably, the inactive genes are merely hydrated, and therefore are damaged more easily; also, their replication requires the correctly orientated water or attachment of a non-specific molecule (e.g., inositol). This could lead to the production of non-enzymatic histones at biologically inactive sequences of gene sites, which would be freed when DNA replication occurred.

- 65-358 THE FATE OF IMPLANTED LIVING EPITHELIAL CELLS INTO THE SUBCUTIS. EXPERIMENTAL

STUDY IN MICE. (E.) Ben-Hur, N. (Rothschild Hadassah U. Hosp., Jerusalem, Israel) and Z. Neuman. *Plast. Reconstr. Surg.* 34(1):37-49, 1964.

Implantation of living epithelial cells into the abraded subcutis of 72 one-month-old mice was followed by the formation of skin appendages and epidermoid inclusion cyst. The implant disappeared in 30% of the animals. In one mouse the histological examination of a dermoid cyst 25 days after implantation revealed the transformation into a structure suggestive of an adenoid cystic basal cell carcinoma; the cyst was surrounded by a glandular formation with a picture similar to a syringocyst adenocarcinoma. The author believes that there is an immature pluripotential (pre-malignant) cell which can develop into sebaceous glands, sweat glands and hair follicles and is also capable of forming the various types of skin cancer.

- 65-359 MALIGNANT SYNOVIOMA IN A COW. (E.) Dungworth, D. L. (Dept. Path., U. California Sch. Vet. Med., Davis), M. R. Wilson, C. L. Gruchy and G. McCallum. *J. Path. Bact.* 88(1):83-87, 1964.

A small swelling on the hock joint of a 3-year-old Jersey show cow began to enlarge 12 mo. after onset, and was diagnosed from biopsy at 16 mo. as a spindle cell sarcoma resembling malignant synovium of man. Following excision at 18 mo. the growth was seen to be a rapidly growing anaplastic fibrosarcoma; lymph node and lung metastases were noted at necropsy. This is believed to be the first report of a malignant synovium in a domestic animal other than the dog.

- 65-360 CHROMOSOME STUDIES IN ACUTE LEUKEMIA. (E., Abstract) Lewis, F. J. W. (Dept. Path., Southmead Hosp., Bristol, England), M. Mactaggart and M. I. J. Andrews. *J. Clin. Path.* 17(4):475-476, 1964.

Karyotype studies of the bone marrow of 20 cases of acute myeloid leukemia (8 examined by the direct technic) revealed in 5 cases cells with 47 chromosomes (significant at the 1% level or greater). In one of these, the supernumerary was a medium sized metacentric, in one an apparent acrocentric in the 13-15 group; these abnormalities were absent from 72-hour cultures of venous blood. A third showed, in 20% of the metaphases studied, a possible morphological abnormality in one of the 13-15 group of chromosomes. The significance of the findings is discussed.

- 65-361 CLINICAL ASSOCIATION OF BASAL CELL EPITHELIOMA WITH HISTIOCYTOMA. (E.) Caron, G. A. (Dept. Derm., Royal Free. Hosp.,

London) and H. M. Clink. Arch. Derm. (Chicago) 10(3):271-273, 1964.

A case is reported of a 65-year-old woman in whom a basal cell epithelioma developed over a period of one yr., on the outer left upper arm, overlying the site of a dermal nodule of many years standing, histological diagnosis of which was histiocytoma cutis.

65-362 EXAMINATIONS OF THE BACTERICIDAL PROPERTIES OF THE SERUM AGAINST GRAM-POSITIVE MICROBES IN PATIENTS SUFFERING FROM LEUKAEMIA, MALIGNANT LYMPHOMA, MYELOMA AND MYELOFIBROSIS. (E.) Libánský, J. (Inst. Hemat. Blood Transf., Prague, Czech.) and Z. Ježková. Experientia 20(3):124-127, 1964.

Bactericidal properties of the serum of 136 pts. with hemoblastoses were studied against the gram-positive bacterium, B. anthracoides. In comparison to sera of normal subjects, significantly increased bactericidal values were found in pts. with acute leukemia, chronic myeloid leukemia, Hodgkin's disease, reticulosarcoma, lymphosarcoma, myeloma and myelofibrosis, but not in pts. with chronic lymphatic leukemia.

65-363 CANCER AND TUBERCULOSIS IN RORSCHACH TESTING. (Ger.) Booth, G. (80 Park Ave., New York, N. Y.). Zschr. Psychosom. Med. 10(3):176-188, 1964.

Rorschach tests of 93 cancer pts. and 82 tuberculosis pts. showed typical answers for pts. with each disease and manifested that in the cancer-prone personality the anal stage in character development predominates over the genital stage. The tumor represents a somatic equivalent to a lost object. Tumor development, the degree of malignancy, and tumor location tend to be influenced by psychosomatic factors. (27 references)

65-364 SQUAMOUS CELL CARCINOMA ARISING IN PLANTAR ULCERS IN LEPROSY. (E.) Job, C. K. (Schieffelin Leprosy Res. Sanat., Karigiri, India) and R. G. Riedel. Int. J. Leprosy 32(1):37-44, 1964.

This report describes 4 leprosy cases (33-61 yr. old men) in whom plantar ulcers have undergone malignant change. These pts., had histories of chronic plantar ulcers in anesthetic tissue for more than 5 to almost 20 yr. Three of the pts. showed definite evidence of chronic osteomyelitis. The main causative factors appear to be chronic ulceration and osteomyelitis.

65-365 OCCUPATIONAL SCROTAL CARCINOMA IN AN AFRICAN NEGRO PATIENT. REPORT OF A CASE. (E.) Bremner, C. G. (Baragwanath Hosp., Johannesburg, S. Afr.). S. Afr. Cancer Bull. 8(3):106-108, 1964.

This is a first report in the literature of an occupational squamous cell carcinoma of the scrotum in an African Negro man (age 64 yr.). The carcinogen was probably the oil and grease to which he was exposed during 41 yr. as a bicycle repair man.

65-366 MITOTIC ABILITY OF LEUKEMIC LEUKOCYTES IN CHRONIC MYELOCYTIC LEUKEMIA. (E.) Sandberg, A. A. (Roswell Park Mem. Inst., Buffalo, N. Y.), Y. Kikuchi and L. H. Crosswhite. Cancer Res. 24(8):1468-1473, 1964.

Blood cells from 10 pts. (who previously were treated with various chemotherapeutic agents) with chronic myeloid leukemia (CML) (7/10 with the abnormal Ph¹ chromosome), cultured for 48 hr. with and without the addition of phytohemagglutinin (PHA), proved capable of division even without PHA, while normal blood showed almost no metaphases unless PHA was added to the culture medium. With PHA, leukemic blood showed a preferential stimulation of mitosis in lymphocytes, whereas without PHA only the immature granulocytic leukemic cells (myeloblasts, promyelocytes, myelocytes) divided. Leukemic leukocytes with the Ph¹ or without the Ph¹ abnormal chromosome divided in vitro without PHA. However, Ph¹-positive blood showed more metaphases with the Ph¹ chromosome in the absence of PHA (92%) than in the presence of PHA (39%). Ph¹-negative leukemic blood, with or without PHA, showed similar numbers of metaphases (15-20/1000 cells).

65-367 EXPERIMENTAL PRODUCTION OF TESTICULAR TERATOMAS IN MICE. (E.) Stevens, L. C. (Jackson Lab., Bar Harbor, Maine). Proc. Nat. Acad. Sci. USA 52(3):654-661, 1964.

When genital ridges from fetal mice (strain 129) at 12.5 days of gestation were transplanted to adult testes of the same strain, 82% developed testicular teratomas: this is a much higher incidence than that which occurs spontaneously. Only 8% of intratesticular 13.5-day genital ridges produced such teratomas, and only 9% of 12.5-day genital ridges produced such teratomas when grafted to the spleen. The use of certain strain 129 sublines as hosts enhanced teratocarcinogenesis (66-82%), while fewer teratomas (41%) were produced in a different host strain (AL/Ks). Using strains other than 129 as donors, no teratomas developed, indicating that the genotype of the graft determines the susceptibility to teratogenesis.

65-368 GENETIC TUMOURS OF NICOTIANA HYBRIDS AND THE HORMONE BALANCE. (E., Abstract) Riegert, A. (Inst. Pharmacol., U. Strasbourg, France). Experientia 20(9):518, 1964.

In hybrids of Nicotiana glauca x N. Langsdorffii made fertile by doubling their chromosome complement through colchicine treatment, and which

regularly bear (on roots and twigs), so-called "genetic tumors", tumor formation diminished progressively in each generation, finally disappearing after 5 yr. of cultivation. From the authors experiments over a number of yr., it appears that the culture of *Nicotiana* hybrids on soils with a sufficient amount of mineral nutrients can progressively suppress the so-called genetic tumors. This supports the hypothesis of Kehr and Smith that these tumors are not genetic, but are due to a hormonal imbalance.

- 65-369 ENDOREDUPPLICATION IN UNTREATED EARLY LEUKAEMIA. (E.) Houston, E. W. (Dept. Med., U. Texas Med. Br., Galveston), W. C. Levin and S. E. Ritzmann. Lancet 2:496-497, 1964.

Cytologic study of 31 cells from a 3-day culture of peripheral blood of a 64-year-old man with pre-leukemia or early acute leukemia (untreated except for prednisone given for the skin manifestations) showed among 7 cells analyzed some chromosomes that were abnormal in form or number, including one tetraploid cell with diplochromosomes typical of endoreduplication. Other significant findings were: the differential counts of peripheral blood showed no evidence of young myeloid cells; there was no evidence in any of the cells counted of a Ph¹ chromosome; the cells required the action of phytohemagglutinin to produce mitoses, suggesting that the majority of mitotic figures studied were lymphoid in origin.

- 65-370 INHERITANCE OF NEOPLASTIC POD IN THE PEA. (E.) Nuttall, V. W. (Genet. Plant Breeding Res. Inst., Canada Dept. Agric., Ottawa) and L. H. Lyall. J. Hered. 55(4): 184-186, 1964.

A character of peas is described which is called "neoplastic pod"; the pod surface is roughened by proliferation of epidermal cells. This pod character was found to behave in inheritance as though controlled by a single dominant gene. The degree of its expression was found to be affected environmentally, being favored by low light intensity and high humidity, but modifier genes might also be involved.

- 65-371 THE LACK OF GROWTH OF INTRAVENOUSLY INOCULATED TUMOR CELLS IN PERIPHERAL WOUNDS. (E.) Vernick, J. (Dept. Surg., U. Illinois Coll. Med., Chicago), G. Garside and E. Hoppe. Cancer Res. 24(8):1507-1508, 1964.

Various doses of Walker 256 and Guerin tumor suspensions were inj. i.v. into 90 and 40 rats, resp., which received skin and muscle incisions 1 hr. prior to the inj. Similar experiments were done with Sarcoma 180 in 20 mice and V2 carcinoma in 4 rabbits. Although all the test animals developed pulmonary metastases, none developed metastases in the scars of 520, 40 and 16

incisions made in rats, mice and rabbits, resp. However, in 9 rabbits given intra-aortic V2 cells (1 million), metastatic tumors developed in 4 incisions. It was noted that i.v. admin. is more nearly analogous to the clinical situation than intra-arterial admin.

- 65-372 GIANT CARCINOMA DUE TO A PERIANAL FISTULA. (Ger.) Hadschiew, D. G. (Dept. Surg., Milit. Hosp. Plovdiv, Bulgaria) and A. G. Angelow. Zent. Chir. 89(32):1228-1230, 1964.

A 38-year-old man presented with a purulent fistula of 5 yr. duration (which developed after surgery for an anal abscess), and a local tumor growth of about 6 mo. duration, which proved to be a prickle cell carcinoma.

- 65-373 CHANGES IN THE STEM LINE OF WALKER CARCINOMA CELLS DUE TO ENVIRONMENTAL FACTORS. (Ger.) Eicke, J. (Inst. Path., U. Munich, Germany), M. L. Meiners and H. Wrba. Zschr. Krebsforsch. 66(3):193-195, 1964.

A Heidelberg strain of Walker carcinoma cells, maintained *in vitro* for several yr., had a hypotetraploid maximal chromosome number of 73-80 (many 77; tetraploid = 84); when these cultured cells were inoc. i.p. into Sprague-Dawley rats, the resulting ascites showed a second chromosome max. between 39-42 (diploid = 42), which occurred about as frequently as the hypotetraploid number. This change occurred after the first *in vivo* passage. Tumor take was decreased by 30% as compared to inoc. with the usual strain (not cultured *in vitro*).

- 65-374 NASOPHARYNGEAL LYMPHOEPITHELIOMA. (Jap.) Otsuka, H. (Dept. Path. Cancer Res. Ctr., Kyushu U. Sch. Med., Japan). Saishin Igaku (Mod. Med., Osaka) 19(7):1708-1719, 1964.

On the basis of an extensive histological and clinicopathological investigation of a total of 70 cases of nasopharyngeal lympho-epithelioma, the author stated that transitional processes exist between Régaud and Schmincke type lympho-epithelioma and squamous cell carcinoma. All of these are considered to be different developmental stages of the same tumor.

- 65-375 CHROMOSOMAL ABNORMALITY AND CHRONIC LYMPHOCYTIC LEUKAEMIA. (E.) Heni, F., H. Siebner and P. R. Burch. Lancet 1:1109-1110, 1964.

In reply to a previous letter by Court Brown in which the presence of the Ph¹ chromosome in chronic lymphatic leukemia (CLL) pts. was considered fortuitous, one letter (Heni and Siebner) in support of Court Brown reported that there were no abnormal

cytological findings other than some "faded" chromosomes in a 55-year-old woman with CLL. She had a family history of the disease, but chromosome studies of the others were not available. In a second letter Burch, in a rebuttal, briefly reviews statistical data and demonstrates that Court Brown's conclusion can be substantiated only by a tremendous sampling of the general population. He predicts that if Court Brown's assumptions were valid, less than 1 in 1000 CLL pts. would have Ch¹; however, present evidence indicates that the Ch¹ chromosome is a sporadic abnormality clustering in rare families and which segregates as a Mendelian dominant which is associated with a predisposition to CLL.

65-376 BLADDER CANCER RESULTING FROM THE PERSECUTIONS BY THE NAZIS. (Heb.)

Lehman, A. (Zamenhof Ctr. Urol. Clin., Tel-Aviv, Israel). Dapim Refuim 23(2):121-123, 1964.

A man who had been employed from 1941-43 as a slave laborer during World War II in the dyeing of skins with aniline dyes, with no protective measures, developed bladder cancer 20 yr. later, at age 46. Expert medical testimony declared that the pt's. disease was malignant and advanced and that it was induced by Nazi mistreatment.

65-377 SPONTANEOUS TUMOURS OF LYMPHOID TISSUE IN MICE. (E.) Reddy, D. J. (Dept.

Path., Andhra Med. Coll., Visakhapatnam, India) and P. S. Rao. J. Ind. Med. Prof. 9(1):4868-4871 and 4888, 1964.

Complementing previous studies (see CRA 2(4): #799, 1964) additional information is given concerning the 13 female mice (in a population of 1507) with spontaneous lymphosarcoma and reticulum cell sarcoma. The disease was generally widely disseminated; in 8 mice multiple groups of lymph nodes were affected, whereas in 5 there was only one group of lymph nodes involved.

65-378 EXPERIMENTAL STUDY OF HETERO-TRANSPLANTATION IN GERM-FREE ANIMALS. (Jap.)

Uno, Y. (Dept. Path., Nagoya U. Sch. Med., Japan) Nagoya Igaku (J. Nagoya Med. Assn.) 86(1):47-63, 1963.

Histological observation of s.c. heterotransplants of human cancer tissues (stomach cancer, malignant melanoma, mammary carcinoma, or squamous cell carcinoma) in germfree (GF) Gifu-Hartrey guinea pigs showed that the grafts survived several days longer and host cell infiltration was milder than in transplanted non-GF guinea pigs. When ascitic Yoshida sarcoma cells (YSC) were heterotransplanted s.c. into GF guinea pigs, they escaped necrosis for longer than 10 days compared to 5 days when transplanted into non-GF guinea pigs. When YSC were heterotransplanted i.p. the cells

underwent cell division with no ascites fluid formation; in non-GF guinea pigs, the cells disappeared almost completely within days with an increased accumulation of ascites fluid. These findings seemed to be explained by the poorly developed lymphoid apparatuses and limited production of antibodies in the GF guinea pigs. Observation of human squamous cell carcinoma cells implanted i.p. in a diffusion chamber into non-GF guinea pigs showed that the cells survived longer (approx. 10 days) before they were destroyed than when implanted without the diffusion chamber. When YSC were used instead of human carcinoma cells, the cells decreased in number immediately after implantation in the diffusion chamber (Type DA filter used), but proliferated thereafter reaching the point of almost a pure culture at 7-10 days. At about 13 days, the cells suddenly underwent necrosis. This seemed to be explained initially by the participation of cell-fixed antibodies and subsequently by circulating (systemic) antibodies.

65-379 PATHOHISTOLOGICAL STUDY OF CARCINOGENIC PROCESS OF CARCINOMA OF THE HUMAN FEMALE REPRODUCTIVE ORGANS. (Jap.) Hosokawa, T. (Dept.

Obstet. Gynec., Jikei-kai Coll., Tokyo, Japan), K. Kobayashi, H. Yahana, Y. Hotta, K. Kamei, Y. Kanda, S. Sato, K. Kitahara, H. Iwata, H. Minegishi, E. Sakai, H. Ito, T. Ikeda, N. Tsutsumi, M. Aoyagi, K. Horiie, T. Arihiro, G. Arai, K. Kawada, H. Miyata, J. Ebihara, M. Yashima, G. Higuchi, I. Tsusaki, T. Nishida, T. Okubo, T. Chujyo, S. Fusejima, T. Mitsui, I. Sekine, M. Sato, H. Satō, A. Yoshimura, M. Karube, T. Shimizu, N. Oyama, R. Ishihara, S. Kodama, H. Matsuura and S. Mogi. Nippon Sanka Fujinka Gakkai Zasshi (J. Jap. Obstet. Gynec. Soc.) 15(9):707-717, 1963.

Through extensive histopathological investigations of carcinoma of the cervix and chorioepithelioma, the authors state that in the case of carcinoma of the cervix abrupt new growth or mutation of proliferating cells in cervical erosions is most likely to lead immediately to evolution of a pre-invasive cancer into an overtly invasive carcinoma. Although "carcinom *in situ*" occupies an undeniable place in the carcinogenic process, it should not be interpreted as part of a two-step process, but rather as part of a continuous carcinogenic process. Chorioepithelioma, unlike carcinoma of the uterus, was considered to develop after going through another clearly definable process, i.e., a hydatid mole, thus suggesting a two-step process in its genesis. The authors stated that mutation of cells or tissue again should be the important concept in understanding the carcinogenic process leading to chorioepithelioma.

65-380 THE PROBLEM OF SPONTANEOUS CURE OF CHORIOEPITHELIOMA. (Jap.) Goonjo, Y. (Dept. Obstet. Gynec., Chiba U. Sch. Med., Japan). Sanfujinka No Sekai (World Obstet. Gynec.) 15(12): 1421-1428, 1963.

The author reported that among various hypotheses accounting for the spontaneous cure of chorioepithelioma, the immunological theory which attributes the cure to the production of antibodies in the mother is gaining support. The author's investigation of 40 pts. who had been cured of hydatid mole or chorioepithelioma (no details as to treatment), revealed that they all possessed antibodies against leukocytes of blood type 0, whereas 17 pregnant females and 7 postpartum females examined did not have such antibodies.

- 65-381 THE HISTOPATHOLOGY OF EPIZOOTIC GLIOSIS AND ASTROCYTOMATA OF THE DOMESTIC FOWL. (E.) Wight, P. A. L. (Poultry Res. Ctr., Edinburgh, Scotland) and R. H. Duff. J. Comp. Path. Ther. 74(3):373-380, 1964.

The histogenesis and histology of a small outbreak of astrocytic gliosis associated with astrocytomas is described in a flock of 1000 closely related White Leghorn fowl, 20 females aged 12-16 mo. being affected; 13 affected birds were available for examination. The outbreak terminated within 4 mo. At necropsy the 13 birds had circumscribed, multicentric tumor masses in the basal part of the cerebellum, often with smaller foci in the medullary rays and folia. The cerebrum was also involved. Histologically, the tumors resembled gemistocytic fibrillary astrocytomas. No metastases were found. No etiologic relation with toxoplasma could be established. The condition described may be a distinct disease of domestic fowls.

- 65-382 HERITABLE VARIATION IN BENGE JONES PROTEIN STRUCTURE IN AN INBRED STRAIN OF MICE. (E.) Potter, M. (NCI, Bethesda), W. J. Dreyer, E. L. Kuff and K. R. McIntire. J. Molec. Biol. 8(6):814-822, 1964.

When 21 Benge Jones proteins produced by plasma-cell neoplasms derived from inbred BALB/c strain mice were studied by the peptide map (fingerprint) technic, 20 were found to be structurally distinct although closely related. Since each was recoverable repeatedly from different transfer generations, these distinct tumor proteins constitute heritable markers, which may be of value in studying the somatic cell changes involved in neoplastic transformation. Of 11 of the proteins (L-chain type) which appeared to be variants of a common polypeptide sequence, all contained an identical set of 11 tryptic peptides and all could be distinguished by several other peptides; 5 proteins with the L-chain sequence included within them were more complex and 4 proteins were composed of the L-chain peptides and a second large set of 10 peptides known to be due to a second polypeptide chain associated with B2A serological specificity. One protein (RPC 20) was serologically and structurally unrelated to any of the other 20. (See also CRA 1(6):#1045, 1963 and ibid. 3(1):#68, 1965.)

- 65-383 ERYTHROBLASTEMIA--A SYMPTOM HELPFUL IN DIAGNOSIS OF METASTASES IN NEOPLASTIC DISEASE. (PRELIMINARY REPORT). (Pol.) Schneiberg, K. (Inst. Oncol., Gliwice, Poland), R. Kuchciński and R. Stiller-Winkler. Nowotwory 14(2):157-164, 1964.

A survey of 115 case history records of pts. with erythroblastemia showed that 66 were due to primary hemopoietic diseases, 30 could be ascribed to hemorrhages, blood transfusions, and infections, and 19 were evaluated as neoplastic erythroblastemia. Of these 19 pts. 4 had no metastases, 4 had soft tissue metastases, and 11 had bone metastases. A group of 57 with confirmed diagnosis of cancer was also investigated, and 6/57 had erythroblastemia, 2 with soft tissue, 4 with bone metastases. It was concluded that presence of erythroblastemia in cancer pts. indicates a likelihood of bone metastases.

- 65-384 IMMUNOLOGIC RESPONSE TO AUTOLOGOUS CANCER VACCINE. (E.) Aswaq, M. (Presbyterian Med. Ctr., San Francisco, Cal.), V. Richards and S. McFadden. Arch. Surg. (Chicago) 89(3):485-487, 1964.

Twenty-one pts. with inoperable terminal cancer were inj. i.m. with homogenate of their own tumor, and their serum was tested for the presence of autologous tumor antibodies by using the passive cutaneous anaphylaxis (PCA) test in white guinea pigs. The sera from all of the vaccinated pts. produced positive PCA reactions at the site of serum inj. in animals which received autogenous tumor homogenates i.v. No effect was seen at the site when normal human serum was inj. in the same animals. Negative results were also obtained with sera from the vaccinated pts. tested against homogenates of autologous normal muscle tissue (obtained at surgery). The antibody titer continued to rise for 3 wk. and remained elevated during week 4; no clinical benefit was observed.

- 65-385 GASTRITIS ASSOCIATED WITH CARCINOMA OF THE STOMACH. HISTOLOGICAL STUDIES OF THE GASTRIC MUCOSA. (Jap.) Matsufuji, S. (Dept. Intern. Med., Kurume U. Sch. Med., Japan), M. Fukuda and T. Sakai. Shokakibyō No Rinsho (J. Clin. Digest. Dis. [Tokyo]) 5(2):97-103, 1963.

Histologic examination of surgical specimens of stomach carcinomas of 25 Oriental pts. (18 males and 7 females; age 20-70 yr.) revealed the presence of atrophic gastritis in the mucosa adjacent to the carcinoma lesion in all cases and in the mucosa distant from the carcinoma lesion in 70% of the cases. Metaplastic changes were seen frequently in the antrum of the pylorus and in the lesser curvature.

- 65-386 GRANULOCYTIC LEUKAEMIA, PHILADELPHIA CHROMOSOME, AND LEUCOCYTE ALKALINE

PHOSPHATASE. (E.) Teplitz, R. L. (Dept. Path., City of Hope Med. Ctr., Duarte, Cal.), R. B. Rosen and M. R. Teplitz. Lancet 2:418-419, 1964.

A 16-year-old male with chronic granulocytic leukemia (CGL) combined with ulcerative colitis presented a persistently elevated leukocyte alkaline phosphatase (LAP). Bone marrow smears showed in all metaphase plates a minute Philadelphia (Ph¹) chromosome (partially deleted chromosome 21). Under suitable treatment the colitis improved and the LAP dropped to low normal. This case, along with another similar one described in the literature, is cited as evidence that CGL and the Ph chromosome may be associated with low, high, or normal LAP. This is evidence that the gene for LAP is not located on chromosome 21.

65-387 MORPHEA-LIKE BASAL CELL EPITHELIOMA ARISING AT SITE OF RECURRENT HERPES SIMPLEX. (E., Abstract) Hurlbut, W. B. Arch. Derm. (Chicago) 90(3):364-365, 1964.

A 72-year-old woman with herpes simplex on the upper lip, frequently recurrent for 30 yr., developed at this site a morphea-like basal cell epithelioma. In a discussion of this brief report, F. Reiss suggests as the precipitating factor excessive sun exposure rather than recurrent herpes.

65-388 LYMPHOSARCOMA IN THE PIKE ESOX LUCIUS L. IN IRELAND. (E.) Mulcahy, M. F. (Dept. Zool., University Coll., Cork, Ireland) and F. J. O'Rourke. Life Sci. 3(7):719-720, 1964.

In a discussion on the neoplasms found in Irish pike, the authors noted that the disease is widespread in Irish lakes and rivers although cancerous pike have not been found in all waters. The incidence (per 100,000) in affected waters varied from 5-12,500. All the cancerous pike were found to have lymphosarcomata to which the genus Esos is susceptible. The authors are seeking information concerning the distribution of the disease elsewhere.

65-389 AUTOIMMUNE HEMOLYTIC ANEMIA WITH TERMINAL LYMPHOMA AND CYTOMEGALIC INCLUSION DISEASE. (E.) Becker, F. P. (Dept. Path., Manchester Mem. Hosp., Conn.) and J. R. Eddy. New York J. Med. 64(10):1211-1212, 1964.

An unusual association of autoimmune hemolytic anemia with late development of anaplastic lymphoma and cytomegalic inclusion disease is reported in a 15-year-old boy, who had been treated with corticosteroids, splenectomy and transfusions for hemolytic anemia over the prior 2 yr. At autopsy, tonsils and abdominal lymph nodes were noted as being replaced by anaplastic carcinoma. Cytomegalic inclusion bodies were

found in the lungs, pancreas, adrenal medulla, kidney (a few) and g.i. mucosa, but not in the spleen.

65-390 ACUTE LEUKEMIA FOLLOWING PHENYLBUTAZONE THERAPY. (E.) Hart, G. D. (Dept. Med., Toronto E. Gen. Orthopaed. Hosp., Ontario, Canada). Canad. Med. Assn. J. 91(9):449-450, 1964.

A 58-year-old man with degenerative disc disease and posterior disc protrusion (with a history of back injury 35 yr. earlier) was given for back pain 2 courses (16 mo. apart) of phenylbutazone (100 mg 4 x/day x 7). Two wk. later he developed spontaneous bruising and was found to have acute myeloid leukemia.

65-391 CHANGES OF PARENCHYMAL CELLS IN THE COURSE OF TRANSFORMATION FROM THE NORMAL TO THE CANCER CELL. (Ger.) Oehlert, W. (Inst. Path., U. Freiburg i. Br., Germany). Hippokrates 35(15):577-587, 1964.

A lengthy theoretical discussion and review (68 references) is presented on the stages of transformation from the normal to the cancer cell. It is concluded that 2 mutually potentiating effects are involved: (1) an irreversible effect of a carcinogen upon nuclear DNA which is transmitted and becomes more and more pronounced with each generation of the daughter cells; (2) an increase in the rate of cellular proliferation. Thus, most malignant tumors occur where the physiological regeneration of cells is most active. There is an inverse relationship between the av. life span of a cell population and the incidence of malignant tumors in the corresponding tissue (with the exception of small intestine). A substance that brings about the fastest transformation of a normal into a cancer cell must have not only a specific carcinogenic effect but also a marked effect on cellular proliferation. (See also CRA 1(4):#660; ibid., 1(7):#1236, 1963; ibid., 2(2):#379; and ibid., (4):#664, 1964.)

65-392 MELANOMA AND TRAUMA. (Ger.) Gartmann, H. (Skin Clin., U. Heidelberg, Germany). Krebsforsch. Krebsbekampf. 5:253-260, 1964.

The possible relationship between trauma and melanoma development is reviewed (50 references) and discussed. In an examination of over 2,800 cases of malignant and benign pigment-cell tumors of the skin, the following was observed: among 295 melanomas (108 males, 187 females; age 15-88 yr.), 208 arose from melanosis circumscripta praeblastomatosa (MCP) of the epidermis, 41 developed in the region of a preexisting junctional ("nevus-cell") nevus (N) and 46 showed no correlation; no malignant transformation occurred following acute or chronic traumatization of N (319 cases) and MCP.

- 65-393 A STUDY OF VARIOUS SPONTANEOUS TUMORS OCCURRING IN STRAIN XLII MICE. (Fr.) Gosse, C. (Gustave-Roussy Inst., Villejuif/Seine, France), R. P. Dechambre, R. Gerard-Marchant and F. Lacour. Rev. Franc. Etud. Clin. Biol. 9(6):632-636, 1964.

Among 900 strain XLII mice which were inbred for 23 generations the authors report the appearance of 8 spontaneous tumors (1 osteofibrosarcoma, 1 sebaceous epithelioma, 6 lymphosarcomas). One of the lymphosarcomas was transplantable in mice of the same strain. The histology of the tumors is described in detail.

- 65-394 CANCER OF THE ESOPHAGUS IN PATIENTS WITH ESOPHAGEAL STENOSIS CAUSED BY CAUSTICS. A REVIEW OF THE LITERATURE AND PRESENTATION OF A PERSONAL CASE. (It.) Sodaro, A. A. (Inst. Gen. Clin. Ther. Surg., U. Rome) and R. Colini. Policlinico (Chir.) 71(2):105-116, 1964.

A case is reported of a 60-year-old man who had spinocellular epithelioma of the esophagus. The pt. had a 46-year-history of esophageal stenosis which had developed following ingestion of lye. The author reviews (35 references) the related literature and discusses the frequency of this association in relation to age, sex, diagnostic facilities and etiologic factors.

- 65-395 THE DEVELOPMENT OF AN UNDIFFERENTIATED TUMOR FOLLOWING FOOT TRAUMA. (Fr.) Tolot, F., A. Pommier, G. Neulat and C. Richaume. Arch. Mal. Prof. 25(7-8):452-453, 1964.

A case is reported of a 46-year-old man who developed an undifferentiated tumor in the area of a fractured ankle (3 mo.) following extensive trauma of the foot. The course of the disease was rapid with hepatic and lymphatic dissemination. Death supervened 2 mo. after diagnosis.

- 65-396 THREE CASES OF LIPOSARCOMA IN DOGS. (E.) Jabara, A. G. (Dept. Path., U. Melbourne, Victoria, Australia). J. Comp. Path. Ther. 74(2):188-191, 1964.

In addition to the 3 cases reported, a literature review (11 references) of breed, age and sex incidences, sites, clinical findings and macroscopic and microscopic appearance of canine liposarcomas is presented.

- 65-397 GASTRIC POLYP AS A PREMALIGNANT LESION. (It.) Morosi, G. (Dept. Surg., S. Antonio Abate Hosp., Gallarate, Italy). Chirurgia (Milano) 19(3):158-162, 1964.

After reviewing (28 references) various theories on the controversial question of malignant

degeneration of gastric polyps, 4 cases are presented (3 men and 1 woman; age 36-66 yr.), two of whom presented with clearcut evidence of malignant transformation of a gastric polyp, a third with a gastric polyp and a large neoplastic ulcer nearby (which appeared to have preceded the polyp formation) and a fourth pt. with clinical, radiologic and gastroscopic evidence of gastric polyp but histologic proof of primary adenocarcinoma.

- 65-398 RELATIONSHIP BETWEEN TESTICULAR RETENTION AND TUMORS OF THE TESTICLE. OBSERVATIONS ON AN OPERATED CASE. (It.) Belloni, G. (Dept. Gen. Surg., Circolo Hosp., Busto Arsizid, Italy), and B. Fraenza. Minerva Med. 55(61-62):2343-2344, 1964.

The case is described of a man who underwent surgery for bilateral testicular retention at the age of 15 yr. and mastectomy for bilateral gynecomastia at the age of 37 yr. At the time of the 2nd operation, his testicular condition had recurred and 5 yr. later, upon development of abdominal pains, he was operated again and found to have a scirrhus seminoma.

- 65-399 TWO INTERESTING ASSOCIATIONS: RHEUMATOID ARTHRITIS AND MYASTHENIA, POLYARTHRITIS AND LYMPHOID LEUKEMIA. (It.) Ryckewaert, A. (38 Ave. de Wagram, Paris), A. Hubault and M. F. Kahn. Minerva Med. 55(51):2109-2110, 1964.

In addition to the 2 examples of lymphoid leukemia-rheumatoid polyarthritis association already presented in CRA 2(3):#584, 1964, the authors mention the finding of the rheumatoid factor in 7/37 pts. with lymphoid leukemia. Possible explanations are given for the malignant transformation of lymphoid cells found in rheumatoid polyarthritis or the reverse phenomenon.

- 65-400 SOME CONSIDERATIONS ON A CASE WITH CANCER OF THE GASTRIC STUMP FOLLOWING RESECTION FOR ULCER. (Fr.) Buffat, J.-D. (38 Rumine Ave., Lausanne, Switzerland). Gastroenterologia (Basel) 101(5):279-284, 1964.

A case is reported of a man who underwent partial (67%) gastrectomy at the age of 35 yr. for an ulcerated gastroduodenal ulcer and died 19 yr. later with glandular epithelioma of the gastric stump with aortic and brain metastases. In the discussion, F. Saegesser reports he had observed 4 cases of cancerization of the gastric stump following resection for duodenal (3) and gastric (1) ulcer. A. Rohner describes 3 similar cases who developed cancer of the gastric stump 19, 20 and 21 yr., resp., following resection for gastric (2) and duodenal (1) ulcer.

- 65-401 THE ASSOCIATION OF CANCER WITH TUBERCULOSIS. STATISTICAL, CLINICAL AND

ANATOMOPATHOLOGIC CONSIDERATIONS ON 51 CASES OBSERVED DURING THE PERIOD 1958-1962. (It.) Babich, S. (S. Santorio Hosp., Nat. Inst. Public Health, Trieste, Italy), S. Pastorelli and G. Zmajevich. Riv. Pat. Clin. Tuberc. 36(6): 527-560, 1963.

Among 762 pts. with primary bronchopulmonary cancer, pulmonary tuberculosis was demonstrable in 51 (7.08%); 46 were men and 5 were women (age 43-77 yr.; mean age 62.3). The large majority (43) were smokers; 39.2% were retired and the remaining belonged to various professional groups. Of 34 cases with histologically verified cancer, 22 were epidermoid carcinomas, 1 adenocarcinoma and 11 undifferentiated carcinomas. In 37/51 cases the TB lesions were fibrotic and/or calcified; in 10/51 the TB was in an active stage; in 4/51 the TB lesions resumed their course after the development of malignancy. In 12/51 cases, lesions of both types were found at the same site; in 27 in the same lung; in 13/27 in close proximity; in 12 they occurred contralaterally.

65-402 THE ASSOCIATION OF POLYPS AND CHRONIC INFLAMMATORY CONDITIONS WITH MALIGNANT TUMORS OF THE LEFT COLON AND RECTUM. OBSERVATIONS ON 302 CASES WHO HAD RADICAL SURGERY. (It.) Porzio, R. (Inst. Gen. Clin. Ther. Surg., U. Rome) and D. Porzio. Progr. Med. (Napoli) 20(1):23-29, 1964.

Among 302 pts. who underwent radical surgery for cancer of the left colon and rectum in the Department of General Surgery of the University of Rome during the years 1950-1963, the following associations were found with the above cancers: polyposis, 23 (7.61%); ulcerative colitis, 1; diverticulosis, 3. In 52.17% of the pts. with the association polyposis-cancer, histological examination revealed the presence in some polyps of adenomatous and adenocarcinomatous transformation. Among the 302 pts. with cancer of the left colon and rectum, histologic types were as follows: adenocarcinoma 90.38%; solid cancer 2.71%; squamous cell carcinoma 5.9%; carcinoid 0.33%; sarcoma 0.99%. A review (50 references) of the related literature is included.

65-403 ENCEPHALIC GLIOMAS IN PATIENTS WITH RECKLINGHAUSEN'S DISEASE. (Sp.) Obrador, S. (Dept. Neurosurg., Nat. Inst. Oncol., Madrid, Spain) and J. Escalona. Rev. Esp. Oncol. 10:259-278, 1964.

Among 2,500 cases of intracranial tumors under observation during the yr. 1946-1963, 3 cases of glioma (1 astrocytoma of the fourth ventricle, 1 temporal astrocytoma, 1 temporo-parietal glioblastoma) occurred in pts. (1 woman and 2 men; age 39-47 yr.) with Recklinghausen's neurofibromatosis. Genetic factors seem to play a role in the etiology of the latter condition and of brain tumors found in these subjects. A review (47

references) of the literature is included.

65-404 LEUKEMIA AND MONGOLISM. (It.) De Cecco, De Cecco, C. (Andres Nunez del Castillo Child. Hosp., Sanremo, Italy) and S. Romangnoli. Rass. Int. Clin. Ter. 44(12):653-657, 1964.

A case is described of a mongloid girl who developed lymphoblastic leukemia at the age of 9 yr. The etiopathogenesis and common chromosomic alterations are discussed.

65-405 TUMORAL DEGENERATION OF SUPERNUMERARY AND ABERRANT MAMMARY GLANDS. (Sp.) Brasa, M. (Dept. Surg., Nat. Inst. Oncol., Madrid). Rev. Esp. Oncol. 10:93-112, 1964.

In a review (20 references) of the classification, anatomy, physiology and clinical aspects of supernumerary and aberrant mammary glands (the first being a breast complete with nipple, areolae, galactophorus ducts and normal glands, while the other lacks areolae and nipples) the author stresses the importance of early surgery and warns against the possibility of their tumoral degeneration. Of operated axillary supernumerary or aberrant mammary glands, 20% presented premalignant changes. Various etiologic factors, such as chronic irritation due to galactophorous duct distention and milk retention following interrupted function, are examined. Tumor degeneration appears to be directly related to the amount of functional capacity of the supernumerary breast and to the degree of blockage of such a function. The most frequent malignant degeneration of supernumerary and aberrant mammary glands is the adenocarcinoma. The author has observed 6 carcinomas, 2 of which arose from 2 typical supernumerary axillary mammary glands; one was localized in an aberrant mammary gland close to the axilla, and 3 arose in axillary mammary glands whose supernumerary or aberrant nature could not be definitely assessed.

65-406 IS THERE A CARCINOGENIC DISPOSITION? FREQUENCY OF CANCER FORMATION FOLLOWING CARCINOGENIC STIMULI. (Ger.) Zurhelle, E. (11 Blondel St., Aachen 51, Germany). Zschr. Aerztl. Fortbild. (Berlin) 53(8):607-608, 1964.

On the basis of colloidal-chemical studies, the author suggests that cancer formation represents a reaction of the cell and nucleus to a type of asphyxia. The possibility of a carcinogenic disposition is discussed. A disposition to carcinoma seems more likely for basocellular forms than for spinocellular forms.

65-407 OPTICAL BEHAVIOR OF DESOXYRIBONUCLEIC ACID FROM LIVER AND HEPATOMAS DURING THERMAL DENATURATION AND REACTION WITH FORMALDEHYDE. (Ger.) Bielka, H. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin), A. Henske and

1. Schneiders. Acta Biol. Med. German 13(2): 161-167, 1964.

The DNA activity of normal liver and transplantable rat hepatomas was studied. No significant differences in the degree of UV hyperchromicity T_m and ΔT values were noted upon heating the DNA samples. At high temperatures, free amino groups were detected by the formaldehyde reaction. Due to thermal dissociation H-bridges were split, but no significant differences were found between normal and tumor DNA in this respect.

- 65-408 COMPARATIVE CHROMOSOMAL ANALYSIS OF CANCER CELLS AND OF IN VITRO IRRADIATED BONE MARROW AND BLOOD CELLS. (Ger.) de Grouchy, J. (Clin. Genet. Med., Enfants Malades Hosp., Paris). Zschr. Mensch. Vererb. Konstitution 37(5):410-425, 1964.

See CRA 2(5):#984, 1964.

- 65-409 IMMUNITY AND THE TREATMENT OF CANCER. (E.) Milner, J. E. (Dept. Microbiol., U. Washington Sch. Med., Seattle), C. A. Evans and R. S. Weiser. Lancet 2:816-817, 1964.

In reply to an editorial suggesting that tumor vaccine might be a useful supplement in cancer therapy and that the technics were safe and simple, it is emphasized that there are dangers in the use of tumor vaccines, such as the risk of accelerating tumor growth after vaccination observed in mice and other experimental animals. The cautious use of immunotherapy only for hopeless (but not moribund) pts. is advocated.

- 65-410 MAST CELLS, THYMECTOMY AND TUMOR REJECTION IN DYSTROPHIC MICE. (E.) Walker, B. E. (Dept. Anat., U. Texas Med. Br.,

Galveston). Texas Rep. Biol. Med. 22(3):640-647, 1964.

Five female F₁ mice, of albino 129J x DBA/2J constitution, with ovaries transplanted from 129/Re-dydypp donors, mated to male 129/Re-Dydypp mice, produced 15/19 pink-eyed young; of these, 4 of the 17/19 which were thymectomized (thyx.) neonatally were dystrophic (dy) at 14-18 days after surgery. Two non-thyx. dystrophic mice and 10 non-dystrophic littermates (8/10 thyx.), labeled with thymidine-H³, received s.c. transplants of spontaneous A/J mammary tumor. Neonatal thyx. did not suppress the development of muscular dystrophy (with continuous muscle regeneration), although it did promote the survival of transplanted mammary tumors, while all tumor grafts were rejected by mice with intact thymuses. Radioautographs demonstrated a large infiltration of lymphoid cells around the tumor homografts. In 3 animals given millipore chambers containing pieces of adult thymus at the time of tumor implantation, tumor growth was not prevented. Since thyx. had this immunologic effect on graft rejection, but did not affect muscular dystrophy it is not likely that murine muscular dystrophy is an autoimmune disease.

- 65-411 CANCER FOLLOWING "HEALED" GASTRIC ULCER. (E.) Marsh, C. B. C. (Dept. Gastroent., Lahey Clin., Boston, Mass.) and E. W. Heffernon. J. Tenn. Med. Assn. 57(10):407-408, 1964.

A 63-year-old man, whose benign gastric ulcer was medically healed successfully as demonstrated by X-rays, returned 4 yr. and 9 mo. later with symptoms suggesting scirrhus carcinoma of the stomach. At laparotomy, biopsy showed an inoperable gastric carcinoma simplex occupying all of the lesser curvature of the stomach with metastases to the omental lymph node. This may be a case supporting the theory that benign gastric ulcer undergoes malignant transformation.

ERRATA:

- 2(4):#678, 1964. In lines 9, 11, 12 and 13, total number of rats is 52 (not 32) in all cases.
 2(2):#290, 1964. Second author should be N. M. Shestopalova.
 2(2):#293, 1964. The first author should be N. M. Shestopalova.
 2(8): 1964. Author index, page i, Haddow, A. (Ed.). Change 1433 to 1443.
 2(Suppl.):1964. Cumulative author index, page 312, after Haddow, A. change 1433 to 1443.

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ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	(Cytopathic effect)	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	Ic.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	In.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

- 65-412 EPIDEMIOLOGY OF LEUKAEMIA. (E.) Clemmesen, J. (Dept. Path., Finsen Inst., Copenhagen, Denmark). Acta Un. Int. Cancr. 20(3): 768-773, 1964.

A review is presented of such epidemiological factors as genetics, radiation and contact which affect leukemia. Various studies have shown higher leukemia rates with higher urbanization, higher income and better medical attention, and for whites as compared to nonwhites. Leukemia rates for Japan are the lowest, while the U.S. and the Scandinavian countries show high rates. The author noted that more significance should be placed on viral transmission of leukemia, such as that seen in Denmark for cattle leukemia, where the frequency in large herds was 69 per 100,000 as compared to 18 per 100,000 in small herds. (12 references)

- 65-413 LEUKEMIAS AND ENVIRONMENT. EPIDEMIOLOGY OF LEUKEMIAS AND INVESTIGATIONS ON THE LEUKEMOGENIC INFLUENCE OF THE PHYSICO-CHEMICAL ENVIRONMENT. (Pol.) Aleksandrowicz, J. (3rd Clin. Intern. Dis., Acad. Med. Cracow, Poland). Pol. Tyg. Lek. 19(35):1313-1315, 1964.

A review of studies on environmental factors in leukemia is presented. In contrast to an earlier report (see CRA 1(9-10):#1666, 1964), further studies showed no significant differences in the content of Sr⁹⁰ in the bones of 20 persons dead of leukemia and 11 dead of other causes. Normal content of Sr⁹⁰ was found in the milk consumed by leukemic pts. for more than 2 yr. Carcinogens from industrial sources must be considered a threat to health. Preliminary studies indicated that leukemogenesis may be ascribed not only to benzene and various petroleum products, but also to DDT and its derivatives, i.e., chlordan and lindane, etc. Contact with chemical factors of more than 2 years' duration was studied in 155 leukemic pts. and was confirmed in half of 60 pts. with chronic myelocytic leukemia; contact with X-rays, in 18%. In cases of lymphatic leukemia, contact with chemical factors was established in 45%; with X-ray, in 14.2%. Only 4.3% of cases with chronic granulocytic leukemia had contact with X-ray (whereas 7.1% of normal control subjects had such contact). No leukemogenic effects could be ascribed to contact with phosphorescent watches and television. (16 references)

- 65-414 ETIOLOGY AND PATHOGENESIS OF LIVER CANCER. (E.) Yoshida, M. T. (Dept. Path., U. Tokyo Fac. Med., Japan). Acta Un. Int. Cancr. 20(3):559-564, 1964.

An extensive panel discussion reviewing the problems of liver cancer in general, with particular reference to the significance of malnutrition, virus hepatitis and cirrhosis. (No references)

- 65-415 METABOLIC PRODUCTS OF AROMATIC AMINES AS CARCINOGENIC FACTORS. (Ger.)

Uehleke, H. (Inst. Pharmacol., U. Tubingen, Germany). Krebsforsch. Krebsbekampf. 5:131-137, 1964.

The transformation of aromatic amines to noxious metabolic products during the process of metabolism (i.e. the acetylation of amino groups, C-hydroxylation on the ring, formation of glucuronides and sulfates) and possible mechanisms of chemical carcinogenesis (mutation, enzyme blockage, synthesis of pseudo-proteins with formation or deletion of auto-antibodies) are reviewed. Amines such as 4-aminodiphenyl, aniline, 2-aminofluorene and 2-naphthylamine, however, comprise only a small group of chemical carcinogens. A scheme of protein synthesis in the cytoplasm is also presented. (See also CRA 1(2):#207, 1963; and ibid., 2(3):#462, 1964). (29 references)

- 65-416 KIDNEY TUMORS OF THE LEOPARD FROG: A REVIEW. (E.) Rafferty, K. A., Jr. (Dept. Anat., Johns Hopkins U. Sch. Med., Baltimore, Md.) Cancer Res. 24(2):169-185, 1964.

In a review with extensive descriptive material, type A inclusions (of tumor cells) were considered the products of replication by an unknown viral agent which was considered causative for Lucké tumors of frogs. The role of these inclusions in pathogenesis is discussed as are various environmental and genetic factors. Variables involved in experimental and spontaneous transmission (including a virus) are also discussed. Although neither a viral etiology nor natural transmission has definitely been demonstrated, on the assumption that both occur, a life cycle for the Lucké tumor was suggested: viral replication without tumor cell growth in mature hosts during hibernation; by spawning time virus is in the urine and thus in the water where the young are infected either at fertilization or when the tadpole hatches. A long latent period of more than 2 yr. may be involved. In the laboratory tumors grow rapidly (unchecked by hibernation) and produce little or no mature virus. The agent is probably of DNA rather than RNA type. The taxonomy and biology of host frogs were discussed, with emphasis on the relationship to distribution of Lucké tumors. (See also CRA 1(5):#928 and ibid., 1(8):#1564, 1963.) (73 references)

- 65-417 ON FROG KIDNEY TUMOR REVIEW BY DR. RAFFERTY. (E.) Duryee, W. R. (Dept. Path., George Washington U., Washington, D. C.). Cancer Res. 24(3):518-520, 1964.

Among remarks concerning a review paper by Rafferty (see the preceding abstract), it was suggested that frog tumors other than Lucké tumors also be studied inasmuch as all of them may have a common

etiology, e.g., an infective DNA virus that always has the same intranuclear target. Some conclusions that differed from those of Rafferty were: Type A inclusions of Lucké's material are postmortem artifacts and in other material are nucleolar products; parasitism and concurrent tumor incidence are probably significant; kidney tumors are frequently metastatic from primary lung carcinomas; ratio of kidney tumor incidence in males and females is 10:1 as a result of parasite distribution, not 2:1 as a reflection of sex hormones; avoid the designation "Lucké tumor" and use instead the generic name of the tumor (renal adenocarcinoma). A reply to some of the points raised is appended. (4 references)

65-418 THE STRUCTURE OF TUMOR VIRUSES AND ITS BEARING ON THEIR RELATION TO VIRUSES IN GENERAL. (E.) Howatson, A. F. (Dept. Med. Biophys., U. Toronto, Canada). Advances Cancer Res. 8:1-40, 1964.

After a general discussion of some of the modern concepts of the virus (the virion, its structural elements and its classification according to symmetry properties), the structure and mode of development of various tumor viruses (including the polyoma, Shope rabbit papilloma, Wart, Simian virus 40, Lucké kidney tumor, adenovirus type 12, mammary tumor, mouse leukemia, avian sarcoma-leukosis and poxviruses) are reviewed. The tumor viruses are then placed in the classification scheme outlined previously. It is concluded that a considerable variety exists in the structure, nucleic acid type and mode of development of the tumor viruses. (See also CRA 1(11):#1957, 1964.) (149 references)

65-419 CANCER IN AFRICA, ESPECIALLY IN REGIONS SOUTH OF THE SAHARA. (E.) Oettlé, A. G. (Nat. Cancer Assn. S. Africa, Johannesburg). J. Nat. Cancer Inst. 33(3):383-439, 1964.

Striking differences are reported in cancer incidence, situation and histopathological type between and within races of Africa. The hypothesis of the uniform liability of mankind to cancer is questioned by the fact that Negri-form races (half-Hamites, Nilotic and W. African Negroes, pygmies and Bantu-speaking) generally have a much lower incidence than that seen in Western races (in which the data suggest that 80% or more of the cancers are environmentally-induced and potentially preventable) or in U.S.

nonwhites. Common to the Negri-form races are primary cancer of the liver, Kaposi's sarcoma, Burkitt's tumor and (in some regions) esophageal cancer, while leukemia and cancers of the stomach, large intestine, breast, endometrium, ovary and brain are generally rare. Mixed races (colored) show high rates of stomach and liver cancer. Asians have a lower mortality, while South African whites resemble U.S. whites, except for higher rates of lip, tongue, stomach, prostate, skin and bone cancer in the former group. The etiological aspects of various tumors are discussed with regard to lymphomas and cancer of the lip (sunlight and tobacco), mouth, postnasal space, esophagus, liver (fungal toxins?), sinuses (snuff), lung (smoking, arsenic), mesothelium (asbestos), uterus, penis (circumcision, ablation), bladder (bilharziasis), prostate, skin (sunlight, tropical ulceration, other ulcers), eye, conjunctiva (sunlight) and brain. The influences of westernization on cancer incidence in African Negroes is also discussed. (229 references)

65-420 PREMALIGNANT GASTROINTESTINAL LESIONS. (E.) Calkins, W. G. (Dept. Med., VA Hosp., Kansas City, Mo.). Geriatrics 19(10):707-717, 1964.

The author reviews, from a clinician's point of view not necessarily in agreement with that of the pathologist, various lesions of the oral cavity (leukoplakia), esophagus (stricture, congenital malformation, diverticula, Plummer-Vinson syndrome), stomach (gastric ulcer, achlorhydria and pernicious anemia, gastric polyps) and colon (adenomatous polyps, chronic ulcerative colitis and diffuse familial polyposis) with regard to their importance as premalignant lesions. (40 references)

65-421 ULCERATIVE COLITIS AS A PRECANCEROUS STATE. (Hun.) Polyák, B. (II Surg. Clin., Uzsok St. Hosp., Budapest, Hungary). Orv. Hetil. 105(38):1794-1795, 1964.

In this short review of the literature, the author suggests that while there is no histologic evidence for the cancerous transformation of pseudopolyps in ulcerative colitis, there is a significant statistical correlation between the presence of pseudopolyps and later malignant transformation of exacerbated colitis. The unfavorable prognosis of such cancerous development is pointed out, and radical surgical intervention (total colectostomy + ileostomy) is recommended for all recurrent cases, or cases lasting for over 5 years. (24 references)

See also abstract nos.: 430,479

PHYSICAL CARCINOGENESIS

5-422 A CASE OF AN ATOMIC BOMB SURVIVOR WITH CHRONIC GRANULOCYTIC LEUKEMIA IN THE EARLY STAGE. (Jap.) Tanaka, N. (Nucl. Med. Biol. Res. Inst., Hiroshima U. Sch. Med., Japan), Ito, N. Kamada and K. Okada. Kyushu Ketsueki Kenkyu Dohokaishi (J. Kyushu Hemat. Soc.) 13(2): 124-128, 1963.

Early stage chronic granulocytic leukemia was diagnosed in a 50-year-old married female who at the age of 34 yr. was exposed to the atom bomb from a wooden house 1100 m from the hypocenter in Hiroshima. At the time she suffered flash burns on the side of the face and neck, but no acute radiation sickness. She had been in excellent health until a slight leukocytosis ($13,000/\text{mm}^3$) was noted during a mass survey in March, 1962. A brief review of the literature (18 references) and a discussion of leukocyte alkaline phosphatase and catalase activity and chromosome findings are included.

5-423 ON PRETUMOUR CHANGES IN BONE AND HEMATOPOIETIC TISSUE. (E.) Krajevsky, N. A. (Acad. Sci. USSR, Moscow). Acta Un. Int. Cancr. 20(3):675-676, 1964.

See CRA 1(2):#168, 1963.

5-424 THE EFFECT OF IRRADIATION ON THE PROGRESSIVE GROWTH OF METASTASES FOLLOWING INTRAVENOUS INJECTION OF EHRLICH ASCITES TUMOUR CELLS. (E.) Drážil, V. (Inst. Biophys., CSAV, Brno, Czech.) and V. Jurášková. Neoplasma 11(2):171-176, 1964.

Survival time was significantly lowered in 3-4-month-old albino H strain mice inj. i.v. with Ehrlich ascites tumor (EAT) cells within 24 hr. following irradiation with 60 or 180 r. When EAT cells were inj. i.v. within 30 days following irradiation, a significant lowering of survival time was seen only at 180 r. A very high incidence of liver metastases was seen in the irradiated animals as compared to a 5% incidence in controls; liver metastases were about 2x the size of the lung metastases. The liver metastases occurred several days before the lung metastases and presumably were the cause of the hastened death of irradiated animals.

65-425 X-RAY PRODUCED SARCOMAS IN THE GUINEA PIG. (E.) Maggiora, A. (U. Clin. Derm., Geneva, Switzerland) and J. Lilla. Oncologia (Basel) 18(1):33-42, 1964.

In 34 male guinea pigs (380-580 g), 2 sarcomas were obtained by irradiation (100 and 200 r on the right and left flanks, resp., daily x 6/wk. until death). One sarcoma was predominantly fusocellular in type, occurring after a total

60,000 r; the other was a rhabdomyosarcoma occurring after a total of 56,400 r. Muscular changes, apparently preceding tumor formation, are described and the term "presarcomatosis" is suggested for such changes. (See also CRA 1(4):#616, 1963.)

65-426 INHALED RADIOACTIVE PARTICLES AND GASES. (E.) Davies, C. N. Nature (London) 203:352-355, 1964.

Papers presented at the third Hanford Biology Symposium, and mostly dealing with measuring the incorporation and elimination of radioactive particles and gases within the body, are outlined. Calculation of the cancer-related dose from the inhalation of radon and daughter products was carried out by B. Altshuler et al. by estimations from the surface activity on the bronchial mucosa, i.e., the deposition of ions, nuclei, and particles in the various regions of the respiratory tract was calculated on Lahdahl's model and the mucus transit time worked out for each region; the α -activity on the surface of the bronchial mucus was thus estimated. The basal cells of the segmented bronchi were found to receive the greatest dose (30 rads/working yr. of 2,000 hr.) which amounts to a carcinogenic dose in a working lifetime (as indicated by animal experiments). W. Jacobi also calculated the deposition and mucus transport of radioactive particles in the various regions of the respiratory tract, and he also found that the dose from inhaled decay products was not negligible and that the basal cells of the lower bronchi receive the highest dose. G. Saccomanno reported an increase in the lung cancer of uranium miners. Most tumors were undifferentiated (79% were of the oat-cell type with a preference for the hilar area) in contrast to 71% epidermoid tumors for a non-miner group. M. Kuschner and N. Nelson stated that bronchogenic cancer may be induced by 10^3 - 10^4 rads; 63 μC of strontium-90 in a capsule will yield a squamous cell carcinoma of the lung when imbedded for 3-15 mo. The tumor yield was found to be proportional to the amount of radioisotope. Areas of fibrosis may play a part, as in scar cancer. Virus and radiation may be regarded as cocarcinogens, such a tool which manipulates genetic material. H. Cember induced lung tumors in rats with the chloride and fluoride of cerium¹⁴⁴ (0.5-50 μC /dose, intratracheal inj.). The threshold dose for lung tumor induction in rats by radioactive particles in the lungs was then calculated from lung clearance data plotted against the cumulative tumor frequency. J. W. Park, W. J. Clarke and W. J. Bair reported on chronic effects of inhaled Pu²³⁹⁰² in dogs (exposure up to 48 mo.), which included cardiopulmonary defect and lymphopenia as well as locally invasive bronchial and interstitial tumors of multiple origin (no metastases).

- 65-427 MITOTIC EFFECT OF IONIZING RADIATION ON MALIGNANT AND BENIGN EPIDERMAL HYPERPLASIA IN THE MOUSE. VII. EFFECT OF A SINGLE CONTACT IRRADIATION ON THE SECOND CELLULAR GROWTH PHASE (CELL DIFFERENTIATION). (Ger.) Setälä, K. (Inst. Path. Anat., U. Helsinki, Finland) and E. E. Niskanen. Strahlentherapie 125(1):109-127, 1964.

Female RA-mice pretreated with Tween-60 (provoking benign hyperplasia; BH) and 9,10-dimethyl-1,2-benzanthracene (provoking malignant hyperplasia; MH) for 10 or 60 days were given contact irradiation ($Sr^{90} + Y^{90}$; 1,000 rad/9 min.) 24 hr. after the last treatment. The mode of response of the second growth phase (cell differentiation) to irradiation was studied by light and polarization microscopy and by the histochemical demonstration of protein bound-SH groups and -S-S-bonds. In MH, a high degree of radiation sensitivity was manifested as severe regressive changes in the cells and nuclei, changes in intra- and extracellular anisotropy and dissociation of -SH groups and -S-S- bonds. In BH, tissue structures and -SH groups and -S-S- bonds were almost completely preserved; the changes were only transitory. It is concluded that the cells of MH and BH have qualitatively different biosynthetic and regulatory mechanisms despite the fact that both are derived from the same homologous tissue. Irradiation-induced changes in cell differentiation in BH or MH were not similar to those induced by colchicine in normal mouse epidermis. (See also CRA 1(2):#146 and #200, 1963; *ibid.*, (12):#2075, 1964; and *ibid.*, 2(3):#428, 1964.)

- 65-428 LEUKAEMOGENIC EFFECT OF IONISING-IR-RADIATION TREATMENT IN POLYCYTHAEMIA. (E.) Osgood, E. E. (U. Oregon Sch. Med., Portland). Lancet 2:967, 1964.

A comment on the paper of B. Modan and A. M. Lilienfeld (CRA 2(7):#1256, 1964) is made to emphasize that ionizing radiation prolongs life in polycythemia more effectively than any other method of treatment, that the frequency of acute leukemia decreases rather than increases with time after radiation therapy is instituted, and that the apparent increase with dose is related to the fact that the dose increases with survival time.

- 65-429 ON TRANSPLANTATION OF "RADIATION" TUMORS OF THE MAMMARY GLANDS IN RATS. (E.) Ponomar'kov, V. I. (Dept. Sci., USSR Acad. Med. Sci., Moscow). Bull. Exp. Biol. Med. (Eng.) 56(8):908-910, 1963.

This article is the English version of a Russian article printed in *Biull. Eksp. Biol. Med.* 56(8):85-88, 1963. Mammary adenocarcinomas arising in rats following the s.c. inj. of radioactive niobium were transplantable to other rats. With further transplantation, a gradual rise in the

rate of transplant growth and take was observed, accompanied by progressive anaplasia of the tumor tissue. After the fifth generation, the transplant became capable of metastasization to various internal organs. (See also CRA 2(4):#634, 1964.)

- 65-430 ACUTE LEUKAEMIA AFTER TREATMENT FOR HYPERTHYROIDISM WITH RADIOACTIVE IODINE. (E.) McBride, J. A. (Dept. Med., Postgrad. Sch. Med., London). Brit. Med. J. 2:736, 1964.

A 64-year-old woman who developed acute leukemia 21 mo. after the beginning of I^{131} treatment for hyperthyroidism is described. A review (10 references) of the association of leukemia and therapeutic irradiation is included.

- 65-431 THYROID CANCER: COHORT ANALYSIS OF INCREASING INCIDENCE IN NEW YORK STATE, 1941-1962. (E.) Carroll, R. E. (New York State Dept. Health, Albany), W. Haddon, Jr., V. H. Handy and E. E. Wieben. J. Nat. Cancer Inst. 33(2):277-281, 1964.

Thyroid cancer incidence rates based on cases reported in the New York State Cancer Registry have more than doubled from 1941-1962. The increase was seen in subjects <55 yr. old, while those >55 showed no significant increase. Various explanations for this increase are presented, including the widespread use of X-ray therapy for thymic enlargement in infancy and childhood since 1910.

- 65-432 ATTEMPT TO LOWER THE THRESHOLD FOR LEUKEMOGENIC ACTION OF X-RAYS IN C57BL MICE. (Fr.) Rudali, G. (Lab. Genet., Curie Found., Paris), J. Reverdy and P. Jullien. C. R. Soc. Biol. (Paris) 158(4):675-678, 1964.

Leukemia incidence showed no significant difference in C57BL mice, whether irradiated (250 r) at birth or at the age of 40-45 days, and compared to non-irradiated controls. However, the latent period was much shorter in animals irradiated at birth (5 mo.; older mice, 18-22 mo.). No statistically significant differences were found in the leukemia incidences or latency periods of 50-day-old C57BL mice treated with extracts (0.1 ml) of AKR leukemic virus + X-irradiation (250 r). Leukemia incidence was not increased in 50-day-old C57BL mice treated with 20-methylcholanthrene (total dose 10 mg) + X-irradiation (250 r) 1 wk. later. (See also CRA 1(12):#2069, 1964.)

- 65-433 DOES IRRADIATION OF THE LIVER MODIFY THE BUTTER YELLOW-INDUCED CARCINOGENIC PROCESS? (Fr.) Lacassagne, A. (Radium Inst., Paris). Acta Un. Int. Cancr. 20(3):573-574, 1964.

p-Dimethylaminoazobenzene (DAB; admin. p.o. daily; no other details) was given to rats 30-45 days after X-irradiation (details reported earlier) of

their median and left liver lobes. An additive carcinogenic effect was not observed, and cancerous transformation in the irradiated lobe was delayed. At 8 mo., however, malignant lesions were the same in both irradiated and non-irradiated lobes. A normal latency was seen in hyperrophy and regeneration of non-irradiated liver tissue.

5-434 X-RAY INHIBITION OF URETHAN LUNG TUMORIGENESIS IN MICE: DIRECT EFFECT. (E., Abstract) Foley, W. A. (Dept. Path., U. Minnesota, Minneapolis) and L. J. Cole. Proc. Am. Assn. Cancer Res. 5(1):19, 1964.

The carcinogenic effect in adult (C57L x A)F₁ mice of urethan (U; 1 mg/g i.p.) was partially inhibited by whole body X-irradiation given 1 wk. (25% of mice with tumors) or 8 wk. (57% of mice with tumors) before U. When fractionated X-rays (100 rad/day x 9) were admin. 3 days before or after U, lung tumor inhibition was less (64% and 6%, resp.). Non-irradiated control mice showed 100% lung tumors 24 wk. after U. When the thorax of U-inj. mice was lead-shielded during exposure of the remainder of the body to a single dose of 80 rad, 94% of the mice developed lung tumors; 4% showed tumors when the thorax was directly irradiated with head and abdomen lead-shielded. See also CRA 1(5):#817, 1963; and ibid., 1(11):1873, 1964.)

5-435 BASAL CELL CARCINOMA OF THE VESTIBULUM NASI IN LATE CHRONIC X-RAY DERMATOSIS OF THE FACE. (Cz.) Kúta, A. (Dept. Derm.-Venerol., MDL, Prague, Czech.). Cesk. Otolaryng. 13(4):252-255, 1964.

A 54-year-old woman developed a basal cell carcinoma of the right nasal cavity in the area of

chronic X-ray dermatosis about 35 yr. after radiation treatment for acne.

65-436 MULTICENTRIC ANGIOPLASTIC RETICULOENDOTHELIOMATOSIS OF THE LIVER AFTER THOROTRAST-ARTERIOGRAPHY. (Ger.) Kemnitz, P. (Inst. Path., Med. Acad. Magdeburg, Germany). Zbl. Allg. Path. 106(2):189-197, 1964.

A case report. (See also CRA 2(3):#447, 1964.)

65-437 SKIN CANCER AND SUNLIGHT. (E.) Blum, H. F. (P. O. Box 704, Princeton, N. J.). Science 145:1339-1340, 1964.

In a report of a general conference reviewing the experimental, pathological, biophysical, demographic and epidemiological aspects of the theory that sunlight can cause cancer of the skin, such factors as repeated exposure, the effect of ultraviolet B and its measurement in various geographical areas, relative sensitivity of the subject, and the topographical distribution of skin lesions are discussed.

65-438 LYMPHOMA DEVELOPMENT IN INTRARENAL THYMUS IMPLANTS IN THYMECTOMIZED, IRRADIATED MICE. (E., Abstract) Haran-Ghera, N. (Dept. Radiol., Stanford U. Sch. Med., Palo Alto, Cal.) and H. S. Kaplan. Proc. Am. Assn. Cancer Res. 5(1):25, 1964.

65-439 THE RADIOGRAPHIC EVOLUTION OF OSTEOGENIC SARCOMAS INDUCED IN MICE BY Y90. (E., Abstract) Finkel, M. P. (Argonne Nat. Lab., Ill.), P. B. Jenkins and B. O. Biskis. Proc. Am. Assn. Cancer Res. 5(1):18, 1964.

See also abstract nos.: 490,524,638

CHEMICAL CARCINOGENESIS

- 65-440 ON THE APPLICABILITY OF THE TWO STAGE CONCEPT OF INITIATION AND PROMOTION TO CHEMICAL CARCINOGENESIS IN THE LIVER. (E.) Glinos, A. D. (Dept. Cell. Physiol., Walter Reed Army Inst. Res., Washington, D. C.). Acta Un. Int. Cancr. 20(3):571-572, 1964.

Using 4-dimethylaminoazobenzene or 2-acetylaminofluorene as the initiating, and partial hepatectomy as the promoting factor, it was found that the 2-stage concept is applicable to liver carcinogenesis in rats. Promotion was demonstrated only prior to the appearance of extensive hyperplasia, as the latter signals the onset of the formation of rapidly proliferating tumor cells not subject to further alteration of their growth rate.

- 65-441 TWO DIFFERENT ASPECTS OF THE RAT LIVER CANCERIZATION BY DAB. (E.) Maisin, J. H. (Dept. Path., U. Louvain, Belgium). Acta Un. Int. Cancr. 20(3):569-570, 1964.

The author reviews the results of several studies which were previously reported in CRA 1(6):#1065, 1963; ibid., 2(3):#471, 1964. It is stated that in an experimental series of DAB-induced hepatoma in the unspecified strain of rats used, the incidence of cancer was high while that of typical cirrhosis was extremely low. However, atrophy of the liver commonly preceded the development of cancer.

- 65-442 CONTACT REACTIVITY TO AZO DYE CARCINOGENS. (E.) Gordon, J. (Notre-Dame Hosp., U. Montreal, Canada). Nature (London) 203:884-885, 1964.

Adult albino male and female guinea pigs were sensitized once with a total of 0.4 mg of an azo dye (in complete Freund's adjuvant; 0.1 ml in each foot pad) 3 wk. prior to topical skin testing with a conc. of agent ranging from 0.001-1.0%. Carcinogens producing strong reaction in all guinea pigs sensitized included: 4-dimethylaminobenzene (DAB; 4/4 animals); 3'-CH₃-DAB (5/5), 3'-F-DAB (5/5), 4'-CH₃-DAB (5/5), 4'-F-DAB (5/5) and 2-CH₃-DAB (4/4). A carcinogenic dye designated as MAB sensitized only 2/5. Cross-reactions were as strong as the homologous reaction and seemed dependent upon animal sensitivity. There was good correlation between sensitizing capacity in the guinea pig and binding to rat liver proteins; this correlation also applied for carcinogenicity except for 2-methyl-DAB, a non-carcinogen which was found by J. A. Miller et al. to be bound to rat liver proteins. The results are in agreement with Old et al., that is, for both azo dyes and polycyclic hydrocarbons a parallelism exists between sensitizing capacity in guinea pigs and carcinogenicity in rodents.

- 65-443 A SIMPLE METHOD FOR PREDICTING THE CARCINOGENIC PROPERTIES OF POLYCYCLIC AROMATIC MOLECULES. (E.) Flurry, R. L., Jr. (Dept. Chem., Louisiana State U., New Orleans). J. Med. Chem. 7(7):668-670, 1964.

A more detailed account of the paper previously abstracted as CRA 1(9-10):#1709, 1964.

- 65-444 EFFECT OF TOBACCO SMOKE SOLUTIONS ON PARAMECIUM. (E.) Weiss, W. (Dept. Med., Woman's Med. Coll. Pennsylvania, Philadelphia) and W. A. Weiss. Arch. Environ. Health (Chicago) 9(4):500-504, 1964.

Tobacco smoke dissolved in water caused slowing, eventual cessation of motility, and death of Paramecium aurelia. It is unlikely that the high conc. of either nicotine (3 mg/ml) or phenol (2 mg/ml) required to reproduce the effect of cigarette smoke soln., can singly account for its toxic effect on Paramecium. Cigar smoke proved significantly more toxic than, and 2 charcoal filter brands of cigarettes almost as toxic as, the smoke soln. from a nonfilter brand.

- 65-445 THE CLINICIAN LOOKS AT LUNG CANCER. (E.) Boucot, K. R. (Dept. Prev. Med., Women's Med. Coll. Pennsylvania, Philadelphia) and D. A. Cooper. Clin. Notes Resp. Dis. 3(2):3-6, 1964.

A follow-up is presented of the report abstracted as CRA 1(7):#1369, 1963. Of 142 lung cancers found among the men in the study up to December 3, 1963, 76 were "new" (X-ray evidence occurring during the study period), all of whom were smokers. More than 50% who smoked heavily for >40 yr. had chronic cough. The cancer rate was 4.4% among coughing smokers and 1.9% among non-coughing smokers. More than four-fifths of the "new" cancers developed in men with symptoms before X-ray changes. One of every 13 heavy cigarette smokers who had smoked 40 yr. or more has had proved lung cancer. The authors caution that (1) some smokers who inhaled cigarettes continue to inhale when they switch to pipes or cigars; (2) every effort should be made to establish a diagnosis in adults with symptoms and/or chest X-ray abnormalities, especially if they are smokers; (3) clinicians must be alert, therefore aware of the natural history of the disease. (See also CRA 1(11):#2024, 1964.)

- 65-446 STOMACH CANCER AND THE SOIL. (E.) Editorial. Lancet 2:243-244, 1964.

The author cites the work of P. Stocks and R. I. Davies who found that the incidence of stomach cancer correlated with the conc. of zinc and

contained in the garden soil about their residence. The latter make no attempt to explain how the abnormally high conc. effects induction of stomach neoplasm. The author comments that possibly the zinc-copper ratio affects the uptake of some other constituent of the soil, but evidence for this is as yet lacking.

65-447 INQUEST ON SMOKING. EGO TE ABSOLVO, NICOTIANA TABACUM. (It.) Izar, G. (Dept. Med., U. Siena, Italy). Riforma Med. 78(13):337-344, 1964.

In a rebuttal of recent investigations and statistical data collected mainly in the USA which have labeled tobacco smoking as carcinogenic, the author discusses both the beneficial and negative aspects of tobacco smoking. An important role in the development of toxic effects in the individual smoker is represented by the particular health condition of the smoker and by his method of smoking but, above all, by the quality of the tobacco used and the method by which it is cured. Personal experience and data from the world literature are reported to demonstrate that certain methods of curing tobacco leaves (for instance with sugary liquids) result in the production of tobacco which is more toxic and may even become carcinogenic. Thus tobacco itself, used moderately and appropriately cured, is not damaging to the smoker. Other factors, such as air pollution, should be studied further in the etiology of lung cancer.

65-448 EFFECT OF GLUCOSE ON THE DEVELOPMENT OF EXPERIMENTAL TUMORS. (It.) Tinozzi, F. P. (Inst. Gen. Clin. Theo. Surg., U. Pavia, Italy) and A. Pannella. Arch. De Vecchi Anat. Pat. 40(2):379-388, 1963.

Subcutaneous homotransplants of a 3-week-old 20-methylcholanthrene-induced tumor were made in 30 adult albino rats (av. wt. 200 g), 15 of which 8 days previously had begun treatment with glucose (20% soln.; 1 ml/day, i.m.) which was continued throughout the experiment. The animals were sacrificed 10 days after transplantation. Visible tumors (diagnosed as spindle cell sarcomas) developed within 4 days in all treated rats, while in controls the latent period was 8 days. Tumor growth rate was faster in treated animals and all tumors became ulcerated; no ulcerations were seen in control animals. Histochemical studies revealed increased tumor glycogen in glucose-treated rats. These results thus confirm the existence of a relationship between tumor growth and cytoplasmic glycogen.

65-449 IRON-DEXTRAN AND SARCOMATA. (E.) Lane, R. S. (Royal Samaritan Hosp. Women, Glasgow, Scotland). Brit. Med. J. 2:119-120, 1964.

In commenting upon CRA 2(6):#1096, 1964, the author feels that serious doubts have been raised about the therapeutic safety of iron-dextran, a widely prescribed and valuable antianemic agent. Possible tumor formation and complications in humans due to excessive dosage are discussed (2 references). It is suggested that a study be made of the sarcogenic effect of i.m. iron-dextran when inj. in a manner similar to the established therapeutic system of admin.

65-450 TRYPTOPHAN-NICOTINIC ACID METABOLISM IN PATIENTS WITH TUMOURS OF THE BLADDER AND KIDNEY. (E.) Alifano, A. (Inst. Biol. Chem., U. Bari, Italy), S. Papa, F. Tancredi, M. A. Elicio and E. Quagliariello. Brit. J. Cancer 18(2):386-389, 1964.

Prompted by a further search for the possible connection between tryptophan metabolism and carcinogenesis, the authors determined the urinary excretion of the metabolite 3-hydroxyanthranilic acid. The range of values (in mg/24 hr.) was: trace-18.37 in 18 pts. with primary bladder carcinoma (none engaged in handling aromatic amines); 4.32-7.50 in 5 pts. with renal pelvic carcinoma; 1.63 and 6.0 in 2 pts. with malignant hypernephroma; 2.79 in a pt. with Wilms' tumor; none was detected in 4 pts. with unspecified extra-pelvic kidney tumor; 0-0.5 in 19 normal controls.

65-451 GLUCOSE-6-PHOSPHATE CONTENT IN RAT NORMAL AND DIABETIC LIVERS AND HEPATOMAS. (Ger.) Heise, E. (Robert-Rossle Clin., German Acad. Sci. Berlin), M. Görlich and C. Kemsies. Acta Biol. Med. German. 13(2):149-153, 1964.

Glucose-6-phosphate (G-6-P) content in diabetic (induced by alloxan) liver of Wistar rats was markedly lower and in hepatomas (induced by intragastric diethylnitrosamine 10 mg/kg/day; incub. time 100-120 days) G-6-P was significantly higher than in normal liver. G-6-P content in the livers of diabetic rats with hepatomas was lower than that in normal livers but higher than that in diabetic livers. The possible causes of the different G-6-P contents are discussed.

65-452 HEXOKINASE ACTIVITY IN MITOCHONDRIA OF PRECANCEROUS RAT LIVER AND TRANSPLANTED DENA-HEPATOMAS. (Ger.) Sydow, G. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin). Acta Biol. Med. German. 13(1):97-98, 1964.

The mitochondria of precancerous rat liver in animals which received 60-80 mg diethylnitrosamine (DENA) showed increased hexokinase activity (HA) when compared to mitochondria of normal rat liver. A more significant increase in HA was found in mitochondria of transplanted DENA-hepatomas after 20-40 passages. (See also CRA 2(3):#512, 1964 and the following abstract.)

- 65-453 CHANGES IN THE GLUCOKINASE AND HEXOKINASE CONTENT OF THE RAT LIVER AFTER FASTING, DURING CARCINOGENESIS AND IN PRIMARY AND TRANSPLANTED HEPATOMAS. (Ger.) Sydow, G. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin). Acta Biol. Med. German. 13(2):154-160, 1964.

Studies were performed on normal rat liver (after normal feeding and after fasting), precancerous liver, primary diethylnitrosamine (DENA)-induced hepatomas and transplanted hepatocellular DENA- and DAB (butter yellow)-induced carcinomas in 4-8-month-old male and female rats of Wistar or "Freiburg bunt" breeds. The activity of hexokinase (H) and glucokinase (G) was determined in optical tests with glucose-6-phosphate-dehydrogenase and NADP. In precancerous rat liver, G decreased; in transplanted tumors G disappeared completely, while H increased above normal values. During fasting, both G and H decreased; G showed the more significant decrease. (See also CRA 2(3):#512, 1964 and the preceding abstract).

- 65-454 AUTORADIOGRAPHIC STUDIES OF MAST CELLS IN IRON-DEXTRAN-INDUCED SARCOMAS. (Ger.) Kunz, J. (Inst. Path., Humboldt U., Berlin). Acta Biol. Med. German. 13(2):233-238, 1964.

Twenty rats of the "Rehbrücke" strain (wt. 150 g) were treated s.c. with iron-dextran (10% 0.5 ml x 2/wk. x 5 mo.; total 450 mg); 11 mo. after initiation of treatment, 6/20 rats were selected to receive $\text{Na}_2\text{S}_2\text{O}_4$ (400 $\mu\text{C}/100$ g body wt., i.p.) and were sacrificed 24 hr. later. Tumors (polymorphocellular spindle cell sarcoma) were found in 3/6, while 3/6 showed small, local, nodular induration of the subcutis. Autoradiographic studies and toluidine blue staining techniques revealed the presence in the tumor tissue of round mast cells (MSC) with av. chromatin content; similar studies in 3 tumor-free rats showed no MSC. The demonstration of MSC by these methods is considered a manifestation of the *de novo* formation of MSC in tumor tissue. The significance of MSC in basic metabolism is briefly discussed.

- 65-455 TREATMENT OF PRIMARY FIBROSARCOMA IN THE RAT WITH IMMUNE LYMPHOCYTES. (E.) Delorme, E. J. (Chester Beatty Res. Inst., London, S.W.3) and P. Alexander. Lancet 2:117-120, 1964.

Transplanted fibrosarcomas (originally induced by 3,4-benzpyrene) did not grow in isogenic rats (inbred black and white hooded rats) from which such tumors had been previously excised. Isogenic rats were immunized with non-viable isogenic tumor cells (previously treated with X-rays); prior to inj. spleen cells from these rats or from non-tumor bearing rats were mixed with viable tumor cells with the results that inocula containing "immunized" spleen cells produced palpable tumors at 65 days whereas inoc. with normal spleen cells produced palpable tumors at 2 wk. Repeated i.v.

inj. of thoracic duct isogenic lymphocytes (from inbred rats immunized by exposure to irradiated tumor cells) caused a temporary regression in 3 out of 4 rats, whereas admin. of lymphocytes from non-immunized rats had no effect. Repeated i.v. inj. of thoracic duct allogenic "immune" lymphocytes in 33 random-bred rats produced a slowing of tumor growth and a partial or complete regression in 19 (57%). The immune lymphoid cells did not act as general anti-host cells, but did rather appear to be immunized against tumor antigens; there was no evidence of graft-versus-host reaction.

- 65-456 CHANGES IN BRONCHIAL EPITHELIUM IN RELATION TO SMOKING HABITS. (E.) Auerbach, O. (VA Hosp., East Orange, N. J.), A. P. Stout, E. C. Hammond and L. Garfinkel. Acta Un. Int. Cancr. 20(3):732-737, 1964.

Approx. 100,000 slides of tracheobronchial epithelium obtained from men and women smokers and non-smokers, and children who died from lung cancer or other pulmonary diseases were studied over a period of 8 yr. A marked increase in the number of cells with atypical nuclei was noted in cigarette smokers; these cells were more frequent among men than women and increased in proportion to age. The smallest incidence of such cells was noted in nonsmokers. Ex-cigarette smokers and cigar or pipe smokers showed an incidence of these cells which fell between that of cigarette smokers and nonsmokers. Ex-cigarette smokers only showed the presence of a new type of disintegrating cell, resembling a dying cell, with a contracted nucleus and a halo-like appearance. These histological changes in bronchial epithelium appear to correlate with epidemiologic findings which relate cigarette smoke with the development of lung cancer.

- 65-457 ON THE ASSOCIATION BETWEEN PHOTODYNAMIC AND CARCINOGENIC ACTIVITIES IN POLYCYCLIC COMPOUNDS. (E.) Epstein, S. S. (Children's Cancer Res. Found., Boston, Mass.), M. Small, H. L. Falk and N. Mantel. Cancer Res. 24(5):855-862, 1964.

Determinations of the photodynamic activities of 157 polycyclic compounds comprised of 51 known carcinogens, 39 untested carcinogens and 67 non-carcinogens were performed with the use of *Paramecium caudatum*. Except for benzo[ghi]perylene, high photodynamic activity was limited to homocyclic or heterocyclic compounds with 4 or 5 fused rings. Though significant absorption of light was prerequisite, it was not sufficient to produce high photodynamic activity. While a significant statistical correlation exists between carcinogenicity and photodynamic activity, specific compounds could not be identified as being carcinogenic or non-carcinogenic solely on the basis of the photodynamic assay.

55-458 EXPERIMENTAL CONTRIBUTION TO SYNCARCINOGENESIS IN ESOPHAGEAL CARCINOMAS. (Ger.) Gibel, W. (Robert-Rossle Clin., German Acad. Sci. Berlin). Krebsarzt 19(4):268-272, 1964.

Sprague-Dawley rats (both sexes; 3.5 mo. old) received benzpyrene (B; 0.5 ml of 0.5% oil soln.), ethyl alcohol (EA; 0.5 ml of 20% EA), B (0.5 ml of 0.5% soln.) + EA (0.5 ml of 20% EA), or B (0.25 ml of 0.5% soln.) + EA (0.5 ml of 50% EA) by daily gastric intubation until death. Rats treated by B or EA alone survived for an av. of 1 yr. while rats treated with B + EA died after 8 mo. Malignant tumors did not develop in the digestive tract, but papillomas developed in rats treated with B and B + EA. Hyperplastic and atrophic changes in other organs are mentioned. It is concluded that alcohol has no tumor-inducing action.

55-459 USE OF THE MONGOLIAN GERBIL IN CANCER RESEARCH. (E., Abstract) Handler, A. H. (Child. Cancer Res. Found., Boston, Mass.) and D. Pav. Proc. Am. Assn. Cancer Res. 5(1): 5, 1964.

The Mongolian gerbil (*Meriones unguiculatus*) is discussed as an experimental animal for use in oncological studies. Since there are no reports of spontaneous tumors in these rodents, several tumors were induced by skin painting and i.m. inj. of 9,10-dimethyl-1,2-benzanthracene. A few of the tumors were serially transplantable. Heterologous human, mouse and hamster tumors were transplanted successfully into cortisone- and X-ray-conditioned gerbils. After serial propagation in gerbils, these tumors retained species specificity together with the inability to grow in other species.

55-460 STUDIES ON MOUSE LYMPHOMAS (MN SARCOMA), WITH SPECIAL REFERENCE TO CYTOMORPHOLOGY AND ITS RELATIONSHIP TO BIOLOGY. (E.) Ojima, A. (Dept. Path., Kyoto U. Sch. Med., Japan). Acta Sch. Med. Univ. Kyoto 39(1):24-55, 1964.

Morphologic and biologic studies of 7 lines of the MN sarcoma (5/7 lines originally induced by prolonged admin. of synthetic estrogens of triphenylethylene type; line MN/T by hexestrol; line MN/S developed spontaneously) in na2 stock mice are presented in detail. The pathological pattern of the original and serially transplanted tumors is described. Malignancy was highest in the leukosarcomatous pattern, lowest in the leukemic, and intermediate in the subleukemic or aleukemic sarcomatosis. The more malignant lines showed an increase in malignancy after serial transplantation. The pathological features were correlated with tumor cell size, i.e., the cells of the leukemic line were smaller and more uniform in their size range, subleukemic or aleukemic cells were larger and more varied in size, and the leukosarcomatous cells were intermediate.

A distinctive Golgi apparatus was noted in some leukemic and aleukemic cell lines. Different inoc. doses and sites altered the pathologic features of the tumor lines, ranging from typical leukemia to typical sarcoma. However, each line retained its individuality. It was concluded that the tumor line with the aleukemic pattern after s.c. or i.p. inoc. did not bring about a leukemic picture even if inoculated i.v. Attempts to transform the MN sarcoma into an ascitic form were successful in the first generation of MN/T and MN/B; lines MN/S, MN/R, and MN/O transformed suddenly after several generations; transformation in MN/E and MN/K was difficult. The leukosarcomatous line cells, which were of an intermediate size and lacked the Golgi apparatus, were the most easily converted to ascitic form. It was concluded that the 7 lines of MN sarcoma belong to one entity of disease, which should more appropriately be called 'malignant lymphoma'.

65-461 UPTAKE OF HYDROCARBON CARCINOGENS BY LYOSOMES. (E.) Allison, A. C. (Natl. Inst. Med. Res., London, N.W.7) and L. Mallucci. Nature (London) 203:1024-1027, 1964.

Cultures of 4 types of cells (monkey kidney, chick embryo, HeLa, or mouse macrophage) were incub. for 2-24 hr. in media containing either of the carcinogens 9,10-dimethyl-1,2-benzanthracene, 20-methylcholanthrene, 1,2,5,6-dibenzanthracene, 3,4-benzpyrene (BP) or tricycloquinazoline, or the noncarcinogen anthracene as control. All cell types so exposed showed brilliant fluorescing granules localized in the lysosomes of the cytoplasm, but none in mitochondria or in any nuclear organelle (confirmed by photography and by tritium labelling). Tests of the duration of fluorescence (in monkey kidney cells) showed that anthracene fluorescence disappeared after 48 hr., while the fluorescence of the carcinogens remained virtually unchanged. Experiments with mice confirmed the cell culture findings. It is suggested that the primary target of carcinogens in cells is the lysosomes, and that secondary effects may be perpetuated when the cells continue to divide.

65-462 CHOLANTHRYL-(5)-ACETIC ACID AND CHOLANTHRYL-(5)-PROPIONIC ACID: THEIR SYNTHESIS AND CARCINOGENIC ACTION. (Ger.) Dannenberg, H. (Max-Planck Inst. Biochem., Munich, Germany) and D. Dannenberg-von Dresler. Zschr. Naturforsch. (B) 19(9):801-806, 1964.

Following a single inj. of cholanthryl-(5)-acetic acid (CA; 1 mg in 0.1 ml tributyrin (T); s.c.), 1/6 male and 1/4 female Swiss strain mice (3-4 mo. old) developed spindle cell-like sarcomas of the thorax and forepaw, resp. Of 5 males treated with B-[cholanthryl-(5)]-propionic acid (CP; 1 mg in 0.1 ml T as single s.c. inj.), 1 developed adenoma of adrenal cortex and 1 leukemia; of 5 females, 1 showed round-cell sarcoma with plasma cell-like elements and 1 developed leukemia (673 days). In

controls, T (0.1 ml, s.c.) caused leukemia in 3/7 males and in 1/3 females; T (0.2 ml s.c.) produced leukemia in 2/5 females, while another female showed mammary carcinoma with myeloid leukemia; no changes were noted in male controls. UV- and IR-spectra of the various compounds obtained during the synthesis of CA and CP are discussed in detail.

- 65-463 HISTOGENESIS OF BREAST CANCER. (E.) Rigden, M. C. (Dept. Surg., Washington U. Sch. Med., St. Louis, Mo.), D. W. Brigham III, J. S. Nelson and F. B. Hershey. Surg. Forum 15:356-357, 1964.

Intragastric 20-methylcholanthrene (10 mg x 3/wk. for 7 wk.) was admin. to 40 inbred Wistar-Furth rats (age 50 days), and stages in the development of the mammary carcinomas so induced were followed weekly by gross study of cleared whole pelts and by microscopic study of mammary lesions and tumors. Areas of early proliferation (wk. 5-7 of treatment) were multifocal and similar to normal ductal development. Premalignant cytologic changes did not occur. Later, small lesions fused to form locally invasive papillary or cribriform tumors. No visceral metastases occurred up to 5 mo. after formation of palpable tumors.

- 65-464 HISTOLOGY OF DEVELOPING PLASMA CELL NEOPLASIA INDUCED BY MINERAL OIL IN BALB/c MICE. (E.) Potter, M. (NCI, Bethesda) and R. C. MacCardle. J. Nat. Cancer Inst. 33(3):497-515, 1964.

Early stages of the histogenesis of plasma cell neoplasia were observed in female BALB/c mice given i.p. inj. of 0.5 ml of mineral oil (Bayol F). These changes were found exclusively in the mesenteric oil granulomas and consisted of focal collections of proliferating plasma cells. A discussion (20 references) of the origin of the plasma cell precursors is included.

- 65-465 DURATION OF BRONCHIAL SQUAMOUS METAPLASIA PRODUCED IN DOGS BY CIGARETTE SMOKE CONDENSATE. (E.) Tipton, D. L. (Cancer Res. Inst., San Francisco, Cal.) and T. T. Crocker. J. Nat. Cancer Inst. 33(3):487-495, 1964.

Cigarette smoke condensate (tar; 0.05 ml for first 3 days and 0.1 ml (160 mg) for 5 other days) was applied daily by bronchoscopy on the left mainstem bronchus of dogs; biopsy 3 days later revealed the presence of squamous metaplasia (SM) of respiratory mucosa in all animals. Two dogs were autopsied at various intervals and respiratory tissue blocks scanned histologically. At 3 days, SM extended from the terminal trachea into the left mainstem bronchus with some spread to the right side. By 5 wk., SM had declined as the

major abnormality and a transitional type epithelium became prominent. At 9 wk., normal, transitional and hyperplastic epithelium occurred in equal frequency. By wk. 18, essentially all epithelium was normal. Results indicate that SM is induced rapidly in dogs by tar and that reversal occurs in a sequence of abnormal epithelium states of differentiation which, though progressively more normal, did not reach normal until several divisions of basal cells (the probable site of action of tar) were presumed to have occurred.

- 65-466 THE PRESENCE OF SULFUR IN CIGARETTES AS DETERMINED BY EPR STUDIES. (E.) Lohmann, W. (Dept. Physiol., U. Arkansas Med. Ctr., Little Rock). J. Arkansas Med. Soc. 61(4):99-101, 1964.

The electron paramagnetic resonance (EPR) spectra of tobacco showed a barely visible sulfur (S) signal at about $g = 2$. Manganous chloride (6 lines) was also observed. A clearly defined S signal was obtained for ashes and smoke. In filters (cellulose acetate or charcoal) this signal could be observed only after smoking. A charcoal filter placed between two fiber filters was without effect. The importance of inhaled S in the etiology of bronchogenic carcinoma is discussed (4 references) and methods for eliminating S are proposed.

- 65-467 MYCOTOXINS: AFLATOXIN ISOLATED FROM PENICILLIUM PUBERULUM. (E.) Hodges, F. A. (Food Drug Admin., Washington, D. C.), J. R. Zust, H. R. Smith, A. A. Nelson, B. H. Armbricht and A. D. Campbell. Science 145:1439, 1964.

Thin-layer chromatography of a chloroform-soluble aflatoxin extract produced by Penicillium puberulum Bainer (strain M-56) grown on shredded wheat showed fluorescent bands with R_f values identical with those of the fractions B₁, B₂, G₁ and G₂ of the aflatoxin produced by Aspergillus flavus. Analysis of the toxin (with pure aflatoxins B₁ and G₁ as standards) indicated that the extract is composed of 15% each of aflatoxins B₁ and G₁ and 1% each of aflatoxins B₂ and G₂ (by wt.). The extract produces the typical bile duct proliferation type of liver damage that is characteristic of the aflatoxin effect in 2-3-day-old Peking white ducklings.

- 65-468 SEX DIFFERENCES IN THE EXCRETION OF O-AMINOAZOTOLUENE BY MICE. (E.) Belitskii, G. A. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow). Biull. Eksp. Biol. Med. (Eng.) 55(5):565-568, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 55(5):96-100, 1963. See CRA 1(8):#1461 and also ibid., (7):#1304, 1963.

65-469 INDUCTION OF NEOPLASMS IN GERMFREE RODENTS BY 3-METHYLCHOLANTHRENE. (E.) Pollard, M. (Lobund Lab., U. Notre Dame, Ind.), T. Matsuzawa and J. C. Salomon. J. Nat. Cancer Inst. 33(1):93-99, 1964.

In 4 strains of germfree mice (Swiss-Webster, ICR, C3H and CFW, without antibodies to polyoma and various other viruses) and 2 strains of germ-free rats (Wistar and Fischer) inoc. s.c. in the interscapular region with 0.5 and 1 mg, resp., of 20-methylcholanthrene (MC) in olive oil, tumors appeared in 76% of the mice and 90% of the rats. The types, locations and latent periods of the tumors in germfree animals were similar to those induced by MC in conventional control animals. Tumors were localized, solid, encapsulated s.c. fibrosarcomas in the inoc. area. Fragments of germfree fibrosarcomas were transplanted to germfree mice and rats of the same genetic strains. Tissue cultures of whole fetuses and kidney tissues from the germfree mice and rats showed no CPE. (See also CRA 1(1):#59 and *ibid.*, (6):#1100, 1963; *ibid.*, 2(1):#30 and *ibid.*, (5):#889, 1964.)

65-470 EFFECT OF CASEIN, LACTALBUMIN, AND OVALBUMIN ON 3-METHYLCHOLANTHRENE-INDUCED MAMMARY CARCINOMA IN RATS. (E.) Shay, H. (Fels Res. Inst., Temple U. Sch. Med., Philadelphia, Pa.), M. Gruenstein and M. B. Shimkin. J. Nat. Cancer Inst. 33(2):243-253, 1964.

The development of mammary adenocarcinomas in female Wistar rats receiving daily gastric intubations of 20-methylcholanthrene (MC; total doses of 15 mg (one dose) or 50 and 270 mg (multiple doses) dissolved in 0.55 ml of olive oil) increased from 9%, 15% and 75%, resp., to 19%, 36% and 90%, resp., after the addition of 64% casein to the basic Rockland diet. It is concluded that casein contains some carcinogenesis-accelerating factors which are also present in rats that develop spontaneous cancers without the admin. of MC. (See also CRA 1(5):#853, 1963.)

65-471 MALIGNANT TUMORS OF THE LIVER. EXPERIMENTAL STUDIES: CARCINOGENIC AGENTS; INFLUENCE OF VARIOUS FACTORS; MORPHOLOGICAL STUDY OF EXPERIMENTAL HEPATOMA OF THE RAT; CELLULAR BIOCHEMISTRY; EXPERIMENTAL THERAPEUTIC TRIALS. (Fr., Abstract) Le Breton, E. Chany, J. Boy, A. M. de Recondo, C. Frayssinet, Y. Moulet, A. Jacob, Desmet and Vandenbrouck. Sem. Hop. Paris 40(39-40):2116, 1964.

The authors consider the role of the rice-contaminant fungus *Penicillium islandicum* and the peanut-cake mold *Aspergillus flavus* in the induction of experimental liver cancer in the rat; a toxin induces the cancer with malnutrition as a promoting factor. Results of butter yellow-induced hepatomas in rats are reported in CRA 1(11):#1926, 1964. Biochemical studies of the

nucleic acids and proteins of differentiated cancer cells in order to determine their specific characteristics are stressed. During the course of experimental hepatocarcinogenesis, certain cells are found to derive from the hepatic cell itself (Type 1 hepatoma) at the level of the regenerative nodules. With the more active carcinogens, at wk. 2, proliferation of oval cells, apparently of biliary origin, is noted. At wk. 4, differentiation can occur either toward the malignant hepatocyte (Type 2 hepatoma) or toward a cholangiocytic form. (See also 2(1):#153, 1964.)

65-472 CARCINOGENESIS IN THYMECTOMIZED MICE. (E., Abstract) Duhig, J. T. (New Engl. Deaconess Hosp., Boston, Mass.). Proc. Am. Assn. Cancer Res. 5(1):15, 1964.

Thymectomy (thyx.) alone and thyx. + thymic implant after treatment with nitrogen mustard and cyclophosphamide had little effect on tumor incidence in mice, while untreated thyx. animals showed increased pulmonary tumor incidence as compared to intact controls.

65-473 CARCINOGENIC ACTIVITY OF SOME NITROGEN ISOSTERES OF CARCINOGENIC PENTACYCLIC HYDROCARBONS. (Fr.) Lacassagne, A. (Radium Inst., Paris), N. P. Buu-Hoi, F. Zajdela and P. Mabillet. C. R. Acad. Sci. (Paris) 258(12) (Group. 14):3387-3389, 1964.

A more extended report of CRA 2(7):#1276, 1964.

65-474 AROMATIC PROTECTION AGAINST TOXIC EFFECTS OF 7,12-DIMETHYLBENZ(a)ANTHRACENE. (E., Abstract) Ford, E. (Ben May Lab. Cancer Res., U. Chicago, Ill.) and C. Huggins. Proc. Am. Assn. Cancer Res. 5(1):19, 1964.

20-Methylcholanthrene (MC; 0.5-1 mg) was found to protect rats against the toxic effects of 9,10-dimethyl-1,2-benzanthracene (DMBA; 6 mg) when admin. 8-24 hr. before but not 2 hr. before the DMBA. The protective action of MC was eliminated when dl-ethionine (37.5 mg i.p.) was admin. 4 hr. before but not 4 hr. after MC. (See also CRA 1(6):#1113, 1963; and *ibid.*, 2(7):#1302, 1964.)

65-475 BIOASSAY OF INDUCED MALIGNANCY. (E., Abstract) Homburger, F. (Bio-Res. Inst., Cambridge, Mass.), A. Treger and J. R. Baker. Proc. Am. Assn. Cancer Res. 5(1):28, 1964.

Subcutaneous inj. sites of 3,4,9,10-dibenzpyrene, Benzo(rst)pentaphene (DBP) were excised from C57B1/6 mice, and trocar transplants of cell suspensions from pooled sites were made into the groins of 20 mice of the same strain at weekly intervals following the admin. of DBP. The same

tumor incidence (50%) was reached in all cases at about the same time. The rate of tumor formation at the 50% mark, however, was higher for implants taken 7 or more wk. after DBP inj. than for the induced tumors or implants having shorter contact with DBP. Malignant cells were first seen in carcinogen sites 5 wk. after inj.

- 65-476 STUDY OF THE INTERACTION BETWEEN CARCINOGENIC HYDROCARBONS AND CELL PROTEINS IN TISSUE CULTURE. (Fr.) Nakajima, A. (Radium Inst., Paris) and P. Daudel. Exp. Cell Res. 35(2):434-436, 1964.

Radioactive carbon-labeled 3,4-benzpyrene (BP; 0.22 mg in 0.13 ml acetone) was added to a fresh suspension of embryonic cells from Swiss mice and cultured in M199 medium with or without serum for periods varying from 2-17 hr. in order to determine the BP uptake in the cells. Results showed an appreciable uptake in cells cultured with (6×10^{-6} mg BP/mg dry protein) or without (7×10^{-6} mg BP/mg dry protein) serum; this was lower, however, than the max. uptake (30×10^{-6} mg BP/mg dry protein) seen in the mouse. The presence of serum in the culture tended to slow down the uptake. Addition of BP (0.4 mg in 0.2 ml acetone) to cells from a 48-hour-old culture and then re-cultured in M199 medium with serum for 48 hr. showed an uptake of 9×10^{-6} mg BP/mg of dry protein. The addition of 1,2,5,6-dibenzanthracene (DBA; 0.05 mg in 0.02 ml acetone) to the cellular suspension, with subsequent culture for approx. 48 hr. in M199 medium without serum, showed an uptake of 5×10^{-6} mg DBA/mg of dry protein.

- 65-477 STUDIES IN AIR POLLUTION CARCINOGENESIS. (E., Abstract) Hoffmann, D. (Sloan-Kettering Inst. Cancer Res., New York). Proc. Am. Assn. Cancer Res. 5(1):27, 1964.

Various air pollution samples in New York and Detroit were analyzed for carcinogenic hydrocarbons. After 9 mo. of applying a Detroit sample (20 μ g organic matter/m³ polluted air in 12.5% acetone soln.) to the skin of female ICR mice, 23/30 developed multiple papillomas (2-7 tumors/mouse) and 10/30 carcinomas; after an additional 3 mo., 19 mice had malignant tumors. A corresponding PAH admixture gave 4 tumors, 2 of which were malignant; 3,4-benzpyrene (BP) in corresponding conc. did not produce tumors. A tumor-dose response correlation for exhaust gas "tar" (approx. 100 ppm BP, 150 ppm 1,2-benzanthracene and 8 other carcinogens) showed the most active subfraction (75% skin tumors in 0.405% conc.) to be that obtained from the neutral portion (N-3 0.81% whole tar) as compared to 74 tumors with 50% whole tar.

- 65-478 THE IMPLANTATION OF METHYLCHOLANTHRENE CRYSTALS INTO REGENERATING AND

NON-REGENERATING FORELIMBS OF *XENOPUS LAEVIS*. (E.) Ruben, L. N. (Inst. Exp. Zool., U. Geneva, Switzerland) and M. Balls. J. Morph. 115(2): 239-253, 1964.

Methylcholanthrene (MC) crystals were implanted into regenerating or non-regenerating forelimbs, or abdomens of 78 post-embryonic, immature *X. laevis*. A total of 172 lymphosarcomas developed, and the presence of a regenerating limb system in the carcinogenic environment did not diminish the activity of MC. In some cases, accessory limb structures were obtained near the implantation sites. It was concluded that an individuation field will not control cancer formation if the cells (lymphoid stem cells in this case) forming the cancer are not components of that field. (See also CRA 2(5):#823, 1964 and ibid. 3(3):#635, 1965.)

- 65-479 LIPIDS AND CANCER. (Ger.) Schmidt, F. (Ctr. Exp. Oncol. Res., German Acad. Sci., Berlin). Krebsarzt 19(4):251-264, 1964.

The relationship between lipids and cancer is surveyed. From the author's own experimental data and that in the literature it was found that underfed animals showed a lower rate of spontaneous tumors and carcinogen-induced tumors than did overfed animals. Transplanted tumor takes are augmented in obese animals and decreased in animals showing malnutrition; high fat diets show a tumor-promoting effect. Cancer cells show an elevated lipid and more pronounced cholesterol content, as well as increased need for lipids compared to normal cells of the same origin. Among the lipids associated with cancer are "carcinolipin", present in egg yolk, which is not a complete carcinogen but promotes both normal and malignant growth, and "malignolipin", a phospholipid specific to cancer cells, but whose properties have been only partially verified by the author. The negative correlation between atherosclerosis and cancer in man is thought to be due to a lipid shift (mainly cholesterol derivatives) from blood vessels and organs to the tumor.

- 65-480 EXPERIMENTAL INVESTIGATIONS ON THE GENESIS OF LUNG CARCINOMA. (Ger.) Dontenwill, W. (Inst. Path., U. Munich, Germany). Arzneimittelforschung 14(7):774-780, 1964.

Various tobacco smoke condensates (30 mg of a 50% test soln. of condensate in glycerin and alcohol) were admin. 3x/wk. locally to the skin of the back of 600 male NMR mice for up to 570 days. Only 2 squamous epithelium carcinomas and 1 sarcoma occurred in the area of application. Cigarette smoke condensates were also instilled in the trachea or lung directly by inj. or by opening the thorax, but this led to mechanical and inflammatory injuries. The application method best suited for comparison in humans was the

insufflation or inhalation method. With small doses of diethylnitrosamine (DENA), it was possible to demonstrate carcinogenic stages in the tracheal and bronchial mucosa of golden hamsters. A comparative review of tumor type according to carcinogen, animal species, and method of application, is presented. Because the hamster rarely gets pneumonia or lung adenomatosis, it is the most suitable animal for pulmonary testing of cigarette smoke condensates. Spraying of the hamster's respiratory tract with tobacco smoke condensates resulted in tumors comparable to those observed after 2-3 inj. of nitrosamine, 1 mg/100 g. After 2 inj. of DENA, 1 mg/100 g, basal cell hyperplasia and transition epithelium in the lung and only tiny papillomas in the trachea were seen. However, when the animal is additionally exposed to cigarette smoke or smoke condensate, metaplasia becomes much more pronounced and papillary tumors are greater in size than with DENA alone. Thus, the carcinogenic effect is potentiated by smoke.

- 65-481 EXPERIMENTAL STUDIES ON THE GENESIS OF CARCINOMA OF THE LUNG. (Ger.)
Dontenwill, W. (Inst. Path., U. Munich, Germany).
Krebsforsch. Krebsbekampf. 5:143-150, 1964.

A more extensive presentation of the paper abstracted as CRA 2(3):#461, 1964. See also the preceding abstract.

- HEATED FATS AND ALLIED COMPOUNDS AS CARCINOGENS. STUDIED BY THE NEWT TEST. (E.) Arffmann, E. (Dept. Path., Finsen Inst., Copenhagen, Denmark). *Acta Path. Microbiol. Scand.* 61(2):161-180, 1964.

A report containing extensive tabulations of the results of some heated and oxidated fats and a few allied compounds when applied to the back or tail of *Triton cristatus* or *T. marmoratus* (both sexes). Peroxidized oil of the soybean (SBO) and ethyl linoleate hydroperoxide produced positive responses (epidermal reaction after 3-21 days) considered to be weak when compared with the sensitivity of the animals and magnitude of peroxide values (293 or 858 and 750 or 1500 m.e./kg, resp.). Peroxide reduction by heat or chemical means weakened the carcinogen-like activity slightly. Epoxidized SBO, 16 α ,17 α -epoxyestratrien-3-ol, commercially polymerized SBO and SBO heated at 350°C for 30-60 min. had no effect. All isomers of diepoxybutane and cholesterol heated at 350°C for 1 hr. produced positive reactions. It is concluded that oxidation may be considered the most important process in the transformation of lipids leading to newt-positive and, therefore, carcinogen-suspected products.

- 65-483 METABOLIC BEHAVIOR OF NUCLEIC ACIDS IN SUBCELLULAR FRACTIONS FROM LIVER OF RATS TREATED WITH METHYLCHOLANTHRENE. (E.)

Hishizawa, T. (Dept. Biophys. Biochem., U. Tokyo, Japan), H. Otsuka and H. Terayama. *J. Biochem. (Tokyo)* 56(1):97-100, 1964.

RNA and DNA were prepared from subcellular fractions of liver homogenates obtained from male Wistar rats weighing 60 g which had been treated 2-22 hr. previously with 20-methylcholanthrene (MC; 1 mg in corn oil i.p.) followed by i.p. inj. of P32-orthophosphate or 6-¹⁴C-uracil at various intervals. Compared with controls, the specific activity of RNA from nuclei, ribosomes and cell sap from livers of rats treated with MC increased by 13-54% when determined by incorporation of P32, and increased by 9-56% when determined by incorporation of ¹⁴C-uracil (inj. 3-11 hr. after MC). No significant change in the specific activity of DNA was noted. Sucrose gradient sedimentation patterns showed a nonspecific stimulation of RNA synthesis by MC inasmuch as activity was approx. equal among all RNA fractions and showed an increased value of about 1.3 over that of controls.

- 65-484 HISTOLOGICAL EFFECTS OF INTRA-TESTICULAR INJECTIONS OF CADMIUM CHLORIDE IN DOMESTIC FOWL. (E.) Guthrie, J. (Dept. Path., St. Mary's Hosp., London, W.2). *Brit. J. Cancer* 18(2):255-260, 1964.

Of 38 White Leghorn cockerels (11 months old) which were admin. bilateral intratesticular inj. of 2% cadmium chloride soln., 2/38 showed Sertoli cell adenomas of the right testis after 49 days, and 1/38 developed a well differentiated teratoma of the right testis by day 53. Pituitary glands of fowl with cadmium lesions in the testes showed changes similar to those induced by partial castration. These changes were most marked in the 2 fowl with Sertoli cell adenomas. Increased gonadotropic activity is discussed in relation to its possible role in the induction of these and other non-germinal tumors.

- 65-485 THE EFFECTS OF HEPATOTOXIC AGENTS AND OF LIVER GROWTH ON THE URINARY EXCRETION OF THE N-HYDROXY METABOLITE OF 2-ACETYLAMINO-FLUORENE BY RATS. (E.) Margreth, A. (Inst. Gen. Path., U. Padua, Italy), P. D. Lotlikar, E. C. Miller and J. A. Miller. *Cancer Res.* 24(5):920-925, 1964.

Adult male Holtzman rats subjected to a number of treatments causing liver damage and/or growth, which included admin. of diets (3-9 wk.) containing hepatotoxic agents (0.03% 2-acetylaminofluorene, AAF; 0.06% 3'-methyl- or 2-methyl-dimethylaminoazobenzene; 0.06; 4-aminoazobenzene; 0.3% ethionine; 0.05% thioacetamide) or s.c. admin. of carbon tetrachloride (0.1 ml, every 3 days for 4 wk.), partial hepatectomy, and protein starvation-refeeding, were found to excrete a higher percentage of the carcinogenic N-hydroxy-acetylaminofluorene (N-hydroxy-AAF) following a test dose of AAF (1.5

mg p.o. or 1-3 mg i.p.) than did normal adult rats. Also, the amount of N-hydroxy metabolite excreted after a test dose of AAF was about 5 times greater in young than in adult normal rats. Rats fed thermally oxidized corn oil or the non-urea adduct fraction of thermally oxidized corn oil showed a urinary excretion of N-hydroxy-AAF following a test dose of AAF which was 1.5-2 times higher than in rats fed fresh corn oil. These effects could be correlated with the studies of M. Sugai et al. in which an increased carcinogenicity of AAF was found when it was combined in the diet with thermally oxidized products. No significant alterations in the urinary excretion of the non-carcinogenic 3-, 5- and 7-hydroxy metabolites of AAF were noted under any of the aforementioned conditions.

- 65-486 EXPERIMENTS ON THE CARCINOGENIC ACTION OF HYDROGEN PEROXIDE AND ON THE MECHANISM OF RADIATION CARCINOGENESIS. (Ger.) Schmidt, F. (Ctr. Exp. Oncol. Res., German Acad. Sci., Berlin). Acta Biol. Med. German. 13(1): 74-85, 1964.

Of 649 newborn suckling mice (both sexes; mostly strain AB) treated with 1-3 s.c. inj. of H₂O₂ (0.1 ml of 0.6% soln.), 72 were evaluated at the minimum age of 6 mo. A 28% tumor yield (20/72) was found; malignant neoplasms included leukemia (L) in 6/20 (1 with mammary carcinoma [MC]), MC in 9/20, lymphosarcoma of the thymus in 1/20, lung carcinoma in 1/20, liver hemangiosarcoma in 1/20 and bilateral ovarian tumor in 1/20. Separate evaluation of results following 1 or a series of 3 inj. of H₂O₂ showed an increase in tumor yield from 20% to 33% and a decrease in latent period from 20 to 15 mo. Among 249 newborn suckling mice (various strains) inj. s.c. with H₂O₂-pre-treated normal rat serum, 67 were evaluated at the minimum age of 6 mo.; a 15% tumor yield (10/67) was observed. MC was found in 5/10, L in 1/10, abdominal lymphosarcoma in 1/10 and lung sarcoma in 1/10; 1 mouse showed a probable L. The latent period varied from 9-23 mo. No significant effect on the tumor rate in mice or rats was seen by treating the sera with X-irradiation (750 or 1,000 r).

- 65-487 NUCLEIC ACIDS. V. THE ISOLATION AND PURIFICATION OF NA-NUCLEATES FROM NORMAL TISSUE AND FROM BROWN-PEARCE TUMOR TISSUE. (Hun.) Rosdy, B. (Inst. Biochem., Debrecen U. Sch. Med., Hungary). Magy. Onkol. 8(3):129-136, 1964.

A detailed description of a method for obtaining purified Na-nucleates from normal and tumorous rabbit tissue (liver, kidney) is described, and the purity and base composition of DNA₁ and DNA₂ fractions was investigated. The nucleic acid phosphorus values indicate that larger amounts of nucleic acids can be isolated from tumor tissue. No differences were seen either in the appearance

or composition of isolated nucleates. It is believed that the DNA₁ fraction is only a heat degradation product, while the DNA₂ seemed to be a fairly pure compound.

- 65-488 CARCINOGENIC AZO DYES, DYE-BINDING AND LIVER GLUTATHIONE. (E.) Neish, W. J. P. (Cancer Res. Unit, U. Sheffield, Western Bank, England), H. M. Davies and P. M. Reeve. Biochem. Pharmacol. 13(9):1291-1303, 1964.

Studies in which male albino rats weighing 250 g were inj. i.p. with equimolar amounts of various azo dyes indicate a correlation in the relative carcinogenic capacity of these dyes and their ability to increase the liver glutathione (GSH) content and to form bound dye (BD) in the livers of the rats 24 hr. after admin. The carcinogenic potency of the dye appears to be in direct proportion to the product of BD x GSH. Results suggest that azo dye hepatocarcinogenesis probably needs as its prerequisite the simultaneous occurrence of dye-binding and GSH increase. (See also CRA 1(7):#1317, 1963; and ibid., 1(11):#1937, 1964.)

- 65-489 TUMOUR SPECIFIC IMMUNITY AGAINST MURINE EPITHELIOMAS INDUCED WITH 9,10-DIMETHYL-1,2-BENZANTHRACENE. (E.) Tuffrey, M. A. (Dept. Path., Guy's Hosp. Sch. Med., London, S.E.1) and J. R. Batchelor. Nature (London) 204:349-351, 1964.

Evidence of tumor-specific antigenicity was found in 4/5 epitheliomas induced in C57BL mice with 9,10-dimethyl-1,2-benzanthracene. Either lyophilized tumor or heavily irradiated tumor brei was used for preliminary immunization. Immunization conveyed protection on the host or caused increased susceptibility to tumor growth. If attempts to immunize human cancer pts. against their own tumors are undertaken, it is of great practical importance to answer why the same schedules which induced anti-tumor immunity in some mice, provoked an increased susceptibility in other mice.

- 65-490 CHRONIC POISONOUS EFFECTS OF NATURAL SUBSTANCES. (Ger.) Druckrey, H. Zschr. Lebensmitt.-Untersuch. 125(4):289-294, 1964.

At the 7th Conference of the European Research Committee for the Protection of the Population from chronic toxic environmental damages ("Eurotox") held in Brussels (June 3-5, 1964), R. Truhaut reported on the carcinogenic action of some inorganic substances (nickel carbonyl, metallic nickel, cadmium, arsenic, etc.). A. Lafontaine discussed the contamination of air, water and food by radioactive substances. P. Shubik found that the amount of tar in charcoal-broiled steaks was equivalent to that found in 700 cigarettes. E. Boyland reported on estrogenic substances in plants and their use in cosmetics. F. Dickens

discussed the carcinogenic properties of some lactones, including aflatoxin (see CRA 1(1):#72; *ibid.*, (5):#872, 1963; and *ibid.*, 2(3):#484, 1964). J. Mc. L. Philp reported on the toxic effect of aflatoxin (A). In young rats fed peanut meal for more than 30 wk., liver tumors, and some lung metastases, were found. E. Le Breton found 200 µg of A did not cause embryonal malformation in rats; after partial hepatectomy 50 µg A inhibited liver regeneration of rats; biochemical studies showed blockage of RNA and DNA synthesis. Y. Ueno isolated luteoskyrene and a chloride-containing peptide from Penicillium islandicum, both of which caused malignant hepatic tumors when admin. to rats; biochemical studies revealed the inhibition of respiration, oxidative phosphorylation and glycogen synthesis. F. S. C. Roe discussed the carcinogenic effect of some volatile oils (orange, lemon, eucalyptus etc.). P. N. Magee showed that the alkaloids (cyclic esters of hydroxylated 3,4-unsaturated pyrrolizidines with branching side chain) from Senecio jacobaea caused liver cancer. "Cycasin" (C; methyl-azoxymethanol-glycoside of Cycas plants) produced carcinomas of the kidney and liver in rats. G. L. Laqueur found that C was not carcinogenic to germfree rats but its aglycone (methyl-azoxy-methanol) caused liver cancer in guinea pigs and intestinal carcinomas in rats. H. Druckey showed that methylnitrosourea caused malignant tumors of brain and spinal cord in rats. Azoethan was found to be carcinogenic.

65-491 THE DETECTION AND ESTIMATION OF AFLATOXIN IN GROUNDNUTS AND GROUNDNUT MATERIALS. III. CLASSIFICATION OF AFLATOXIN B₁ LEVELS. (E.) Coomes, T. J. (Dept. Sci. Res. Industr. Res., Trop. Prod. Inst., London, W.C.1), P. C. Crowther, B. J. Francis and G. Shone. *Analyst* 89:436-437, 1964.

65-492 THE CARCINOGENICITY OF INHALED ARSINE AND TRIPHENYL ARSINE IN RABBITS.

(E., Abstract) Holland, R. H. (VA Hosp., Dallas, Tex.) and A. R. Acevedo. *Proc. Am. Assn. Cancer Res.* 5(1):28, 1964.

65-493 PATH OF N,N-2,7-FLUORENYLBISACETAMIDE (2,7-FAA) AND ITS METABOLITES IN THE RAT. (E., Abstract) Dyer, H. M. (NCI, Bethesda) and H. P. Morris. *Proc. Am. Assn. Cancer Res.* 5(1):16, 1964.

65-494 BIOCHEMICAL STUDIES OF LIVER TUMORS INDUCED AND TRANSPLANTED IN RATS OF AN INBRED STRAIN. (E., Abstract) De Lamirande, G. (Cancer Inst. Montreal, Canada) and J. Gordon. *Proc. Am. Assn. Cancer Res.* 5(1):14, 1964.

65-495 RESTORATION OF AMINOFLUORENE HEPATOCARCINOGENESIS IN THYROIDECTOMISED RATS TREATED WITH IODIDE. (E., Abstract) Goodall, C. M. (U. Otago, New Zealand). *Proc. Am. Assn. Cancer Res.* 5(1):22, 1964.

65-496 METABOLIC PROFILES OF RAT LIVER DURING CARCINOGENESIS AND RELATED HEPATIC CONDITIONS. (E., Abstract) Burke, W. T. (West Virginia U., Morgantown), J. McCoy, E. Krueger and E. C. Gangloff. *Proc. Am. Assn. Cancer Res.* 5(1):9, 1964.

65-497 HYPERBASOPHILIC REGIONS AS SITES OF TUMOR FORMATION IN PRENEOPLASTIC LIVER PARENCHYMA. (E., Abstract) Daoust, R. (Inst. Cancer Montreal, Canada), F. Molnar and A. Simard. *Proc. Am. Assn. Cancer Res.* 5(1):13, 1964.

For related studies, see CRA 1(5):#843, 1963.

See also abstract nos.: 415,427,432-434,510,524,568,570,571
573,578,579,584,588,592,593,594,598

VIRAL CARCINOGENESIS

- 65-498 ML: A NEW ANTIGEN FOUND IN LEUKAEMIAS AND MAMMARY TUMOURS OF THE MOUSE. (E.) Stuck, B. (Sloan-Kettering Inst. Cancer Res., New York), E. A. Boyse, L. J. Old and E. A. Carswell. *Nature (London)* 203:1033-1034, 1964.

An antigen, designated ML (mammary leukemia), has been detected in several leukemias of the DBA/2 strain and in the mammary tissue and mammary tumors of mouse strains infected with the mammary tumor agent. The antigen was first detected by isoimmunization of C57BL/6 mice with a DBA/2 spontaneous leukemia (DBA/2 female SL1), another spontaneous leukemia (DBA/2 male SL2), and a urethan-induced leukemia (DBA/2 male U12); there was no CPE on several transplanted leukemias induced in adult DBA/2 mice by percutaneous application of 9,10-dimethyl-1,2-benzanthracene. The findings suggest a parallel with the TL (thymus leukemia) system. However, there are clear indications that ML is associated with presence of a known virus, the mammary tumor agent. If so, this may indicate either that this virus can be leukemogenic in some circumstances or that the presence of ML antigen in DBA/2 leukemias is an example of antigenic conversion due to the infection of leukemia cells with an unrelated virus.

- 65-499 REGULATION OF GROWTH AND ORIENTATION IN HAMSTER CELLS TRANSFORMED BY POLYOMA VIRUS. (E.) Stoker, M. (Inst. Virol., U. Glasgow, Scotland). *Virology* 24(2):165-174, 1964.

In polyoma virus-transformed cells derived from clone 13 of the BHK21 line of hamster fibroblasts, the unrestricted growth and disoriented arrangement of the cells were affected by contact with normal fibroblasts which inhibited multiplication of the transformed cells and led to their regular orientation; contact with irradiated transformed cells from hamster or mouse embryo cultures also inhibited multiplication as did giant cells produced by the action of bromodeoxyuridine. The results suggest that contact inhibition involves both emission of and response to a contact-promoted signal, and that polyoma virus transformed cells still retain the ability to respond. (See also CRA 1(1):#116; *ibid.*, (8):#1536, 1963; and the following abstract.)

- 65-500 CHARACTERISTICS OF NORMAL CELLS IN MIXED CLONES ARISING AFTER DELAYED TRANSFORMATION BY POLYOMA VIRUS. (E.) Stoker, M. (Inst. Virol., U. Glasgow, Scotland) and A. Smith. *Virology* 24(2):175-178, 1964.

After infection of BHK21 cells with polyoma virus (PV), normal cells segregating from transformed cells in mixed clones were isolated (see CRA 1(8):#1536, 1963) and studied. Reinfection with

PV caused increased sensitivity to transformation in normal cells from 3 out of 6 mixed clones. Normal cells in the remaining mixed clones and from 4 normal unmixed clones recovered after infection; these cells were of similar sensitivity to the original BHK21 cells. The increased sensitivity may reflect a genetic heterogeneity in the original population with selection of the more sensitive cells; some heterogeneity was shown by 1 clone with low sensitivity isolated from 10 freshly isolated uninfected cells.

- 65-501 THE EFFECT OF pH ON TRANSFORMATION OF BHK21 CELLS BY POLYOMA VIRUS. I. RELATIONSHIP BETWEEN TRANSFORMATION RATE AND SYNTHESIS OF VIRAL ANTIGEN. (E.) Kisch, A. L. (Inst. Virol., U. Glasgow, Scotland) and K. B. Fraser. *Virology* 24(2):186-192, 1964.

When the frequency with which BHK21 hamster fibroblast cells undergo transformation after infection by polyoma virus (PV) was studied as a function of pH, the transformation rate (t col) was highest at pH values between 7.6 and 7.8 and lowest at 7.0 and below. This was directly related to pH rather than to bicarbonate ion conc. and was dependent of secondary selective processes. The change in the percentage of PV-infected cells which synthesized nuclear viral antigen (detected by immunofluorescent studies) was not the same as the change in the percentage of cells which underwent transformation as pH was varied.

- 65-502 LARGE-SCALE PRODUCTION OF POLYOMA VIRUS IN MOUSE ASCITES TUMOR CELLS IN VIVO. (E.) Nordenskjöld, B. (Dept. Microbiol., U. Illinois, Urbana). *Virology* 24(2):225-227, 1964.

A method is described for the production of polyoma virus in vivo in which 10^7 or 5×10^6 sonicated ascites SEYF sarcoma cells from adult A.BY or semiisologous F₁ hybrid mice were mixed with 3-150 HA (hemagglutinating units) of polyoma virus. The cell-virus mixture was incubated, inoc. i.p. into mice and cells were harvested 6 days later. The amount of virus obtained from 1 mouse is about 100x more than the usual harvest from 1 ordinary Petri dish tissue culture of infected mouse embryo cells. In addition to SEYF, other ascites tumors were tested for sensitivity to polyoma virus. The lymphomas (6C3HED, MCIM, EL4, L1210), sarcomas (MSWB, MDAY) and Krebs 2 tumor were relatively resistant to polyoma infection.

- 65-503 THE ISOLATION AND MORPHOLOGY OF THE LUCKÉ FROG KIDNEY TUMOR VIRUS. (E.) Lunger, P. D. (Rockefeller Inst., New York, N. Y.). *Virology* 24(2):138-145, 1964.

The first isolation of viruses from "spontaneous" Lucké renal adenocarcinomas of 9 leopard frogs is described. Isolation was accomplished by equilibrium centrifugation in a Ficoll gradient and visualization was done by negative contrast staining and thin electron microscopy. The morphology of the virus particles was reported in CRA 2(2):#270, 1964. The close resemblance of the viral particles to other known viruses is discussed. The total number of capsomers on the Lucké virus was calculated to be 162, a figure identical to that of herpes viruses.

- 65-504 THE STUDY OF THE ROLE OF THE MILK FACTOR IN THE PRODUCTION OF HUMAN BREAST CANCER. (E.) Martynova, R. P. (Inst. Cytol. Genet., Acad. Sci. USSR, Moscow). Acta Un. Int. Cancr. 20(3):656-658, 1964.

Studies were performed to clarify whether there exists in humans a factor similar to the milk factor in mice which plays a significant role in the etiology of spontaneous mammary cancer. There was no significant difference in the frequency of mammary cancer in a group of 145 women (age 30 yr. or over) who were breast-fed by their mothers (14 or 9.7% tumor incidence) and a group of 123 women who were not breast-fed (8 or 6.5%). On examination of 2730 woman-relatives in the female line and 2749 woman-relatives in the male line there was no difference in the frequency of the disease in the 2 groups as shown by an incidence of 1.76% and 1.78%, resp. The results indicated that the milk factor seen in mice was not observed in man.

- 65-505 IMMUNOLOGICAL DETERMINANTS OF ONCOGENESIS IN HAMSTERS INFECTED WITH SV40 VIRUS. (E.) Deichman, G. I. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow) and T. E. Kluchareva. Virology 24(2):131-137, 1964.

See CRA 2(6):#1136, 1964.

- 65-506 IN VITRO ASSAY FOR SHOPE PAPILLOMA VIRUS. (E.) Christensen, J. A. (Dept. Oncol.-Hemat., U. Indiana Med. Ctr., Indianapolis). J. Bact. 88(5):1519-1520, 1964.

Trypsinized continuously-culturable Kansas cottontail rabbit epithelial cell line P-114 (10⁵ cells/ml) was inoc. in suspension with 1:10 dilution in culture medium of Shope papilloma virus (SPV-C; pool of 3 successive 20% saline extractions). The approx. total and viable cell counts (x 1000) after 3-35 days of incubation were: 16 days = 40 and 35 (550 and 450 for controls) and 35 days = 550 and 500 (500 and 350, resp., for controls). Cells from cultures inoc. during the growth-inhibiting period showed CPE. In replicate experiments with the same batch of SPV-C, the titers obtained (10⁻³) were identical with those obtained by titration in Indiana cottontail

rabbits. Three days after virus inoc., P-114 cells were harvested, washed 3x and inoc. into rabbits. Papillomas grew in 2/4 rabbits with an induction period of 27 days, as compared with induction periods of 18-21 days for positive control virus. The CPE and papilloma formation were completely inhibited by prior incub. at 37°C for 30 min. of the virus inoculum with specific anti-serum.

- 65-507 A CYTOPATHIC EFFECT BY SHOPE PAPILLOMA VIRUS IN A CELL LINE DERIVED FROM NORMAL COTTONTAIL RABBIT SKIN EPITHELIUM. (E., Abstract) Christensen, J. A. (Dept. Med., Indiana U. Med. Ctr., Indianapolis). Proc. Am. Assn. Cancer Res. 5(1):11, 1964.

- 65-508 LIMITED GROWTH PERIOD OF HUMAN LUNG CELL LINES TRANSFORMED BY SIMIAN VIRUS 40. (E.) Moyer, A. W. (Lederle Lab., Am. Cyanamid Co., Pearl River, N. Y.), R. Wallace and H. R. Cox. J. Nat. Cancer Inst. 33(2):227-236, 1964.

Although growth potentials of human lung cell lines transformed by SV40, were greatly enhanced, only 2/23 cultures attained autonomous growth.

- 65-509 FURTHER ELECTRON MICROSCOPIC STUDIES ON THE MORPHOLOGY OF THE MOLONEY AGENT. (E.) Dalton, A. J. (NCI, Bethesda), F. Haguénau and J. B. Moloney. J. Nat. Cancer Inst. 33(2):255-275, 1964.

Using a method combining cryostat sectioning and negative staining, cell fragments from the bone marrow of rats with leukemia induced with the Moloney agent were studied with the electron microscope. Virus particles in various stages of maturation, some possessing tails, were observed in association with thinly spread fragments of cytoplasm, presumably from megakaryocytes. The presence of stout, straight tails is not considered an artifact but is rather characteristic of the mature form of this virus group. A close morphological similarity is suggested between the members of this family of viruses. (See also CRA 3(3):#418, 1965.)

- 65-510 NUTRITIONAL FACTORS, LONG-TERM DDT INTAKE, AND CHLOROLEUKEMIA IN RATS. (E.) Kimbrough, R. (Commun. Dis. Ctr., U. S. Dept. Health, Educat. Welfare, Atlanta, Ga.), T. B. Gaines and J. D. Sherman. J. Nat. Cancer Inst. 33(2):215-225, 1964.

Male random-bred Sherman rats were fed either a purified high-fat diet (PHFD), PHFD + DDT (3.5 mg/rat/day) 6 mo. later, or a purified normal-fat diet (NFD) + DDT (as above). Chloroleukemia developed in 7 animals (all <16 mo. old), of which 4/7 were fed PHFD, 2/7 with PHFD + DDT and 1/7 with NFD + DDT. It is concluded that animals on

purified diets develop leukemia; the addition of DDT to the diet has no bearing on leukemia development since leukemia was never observed in the author's experiments with DDT and other pesticides outside of these 2 studies. The leukemia was successfully transplanted and its viral origin is being investigated.

- 65-511 PROLIFERATIVE BEHAVIOUR OF CELLS FROM "SPONTANEOUS" AKR AND GROSS VIRUS-INDUCED C3H LYMPHOMAS. (E., Abstract) Axelrad, A. A. (Ontario Cancer Inst., Toronto, Canada). *Proc. Am. Assn. Cancer Res.* 5(1):4, 1964.

The i.v. inj. of cells from "spontaneous" AKR lymphomas (SL) into normal AKR hosts gave rise to a much higher number of macroscopic colonies in the spleen than did the same dose of Gross virus (GV)-induced C3H lymphoma cells in C3H hosts. Upon inj. of cells from SL and GV-induced C3H lymphoma into (AKR x C3H)F₁ hybrids, 3/3 AKR lymphomas showed the same high colony-forming efficiencies (CFE) in F₁ hybrid as in AKR spleens (approx. 10³ cells produced an average of 1 colony/spleen), but C3H lymphomas had low CFE in both kinds of hosts, although more colonies were sometimes produced in F₁ hybrid than in C3H spleens from the same cell dose (510⁵ cells produced 1 colony/spleen from 8/11 lymphomas). Thus, high CFE is an inherited quality in AKR lymphoma cells. Cells of similar quality were found in primary lymphomas induced in AKR mice by inoc. of newborns with GV and in GV-induced C3H lymphomas after serial propagation in isologous spleens. These high CFE formers may represent a class of malignant cells common to all primary lymphomas induced by GV or occurring spontaneously in mice, but generally are seen with higher frequency in lymphomas arising from the AKR strain. (See also CRA 1(5):#961 and *ibid.*, (8):#1559, 1963).

- 65-512 STUDIES ON HUMAN LEUKEMIA. II. STRUCTURE AND QUANTITATION OF MYXOVIRUS-LIKE PARTICLES ASSOCIATED WITH HUMAN LEUKEMIA. (E.) Smith, K. O. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.), M. Benyesh-Melnick and D. J. Fernbach. *J. Nat. Cancer Inst.* 33(3):557-570, 1964.

Using a sensitive method for the identification and quantitation of viruses, myxovirus-like particles from human leukemia (HL) were found to have an av. diameter of 178 mμ as compared to 138 mμ in those from human infectious mononucleosis (HIM); particles from both were structurally similar to each other and to those associated with murine and avian leukemia, except for the presence of tail-like appendages found in murine leukemia but not in human specimens. Normal whole blood cells, on prolonged storage at 4°C, released particles remarkably similar in morphology and size to those seen in materials from pts. with HL and HIM. (See also CRA 1(8):#1580,

1963; *ibid.*, 2(7):#1330, 1964 and the following abstract.)

- 65-513 STUDIES ON HUMAN LEUKEMIA. III. ELECTRON MICROSCOPIC FINDINGS IN CHILDREN WITH ACUTE LEUKEMIA AND IN CHILDREN WITH INFECTIOUS MONONUCLEOSIS. (E.) Benyesh-Melnick, M. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.), K. O. Smith and D. J. Fernbach. *J. Nat. Cancer Inst.* 33(3):571-575, 1964.

Negative staining and electron microscope examination of untreated human plasma or serum samples revealed the presence of myxovirus-like particles (>20 particles/field) in 67% of 24 children with acute leukemia (AL), 75% of 12 children with infectious mononucleosis (IM), 3% of 60 normal children and none of 13 normal adults. When intermediate positives (10-19 particles/field) were included, the figures for the 3 groups of children were 79%, 100% and 20%, resp. No significant morphologic differences were noted between the particles found in normal children or in children with AL or IM. Similar particles in great numbers were noted in the supernatant fluids of bone marrow cultures that had undergone spontaneous lymphoblastoid transformation (derived from children with AL or IM). (See also CRA 1(8):#1580, 1963; *ibid.*, 2(7):#1330, 1964 and the preceding abstract.)

- 65-514 CYTOMEGALOVIRURIA IN CHILDREN WITH ACUTE LEUKEMIA AND IN OTHER CHILDREN. (E.) Benyesh-Melnick, M. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.), S. I. Dessy and D. J. Fernbach. *Proc. Soc. Exp. Biol. Med.* 117(2):624-630, 1964.

Virus isolations were carried out over a 2-yr. period (1961-1963) from urine samples of 101 children: 42 with acute leukemia (AL), 30 with diseases other than leukemia (DOTL; 8 with hemolytic anemia and/or thrombocytopenia; 10 with miscellaneous blood dyscrasias; 3 with nonhematologic disorders; 9 with malignancies other than leukemia), and 29 apparently normal control subjects. The children ranged in age from several mo. to 15 yr. but most of them were age 2-8 yr. Cytomegalovirus was isolated 39 times: 18 from 7 with AL, 12 from 6 with DOTL and 9 from 6 controls. In addition, 5 isolates were obtained from 7 urine specimens of 4 infants with cytomegalic inclusion disease. Twenty-five siblings of 19 children with AL as well as 30 of their parents were tested and all yielded negative results with one exception, the 6-month-old baby sister of a leukemic pt. who yielded cytomegalovirus in a throat swab. No urine samples were taken from the infant.

- 65-515 ASSOCIATION OF ELECTRON-DENSE PARTICLES WITH HUMAN ACUTE LEUKEMIA. (E.) Porter, G. H. III (Div. Hemat., Ochsner Clin.,

New Orleans, La.), A. J. Dalton, J. B. Moloney and E. Z. Mitchell. J. Nat. Cancer Inst. 33(3): 547-556, 1964.

Electron microscope studies have revealed the presence of electron dense particles in the peripheral blood of 8/56 pts. with acute leukemia, 0/51 random normal controls and 1/36 age- and sex-matched normal controls. The particles are spherical, have 1 or 2 concentric membranes, a central nucleoid (often), a diameter of 800-900 Å, and are morphologically similar to viruses described in avian and murine leukemias.

65-516 QUANTITATION OF A MURINE LEUKEMIA VIRUS WITH A SPLEEN COLONY ASSAY. (E.)

Pluznik, D. H. (Dept. Genet., Weizmann Inst. Sci., Rehovoth, Israel) and L. Sachs. J. Nat. Cancer Inst. 33(3):535-546, 1964.

A method is described for the rapid quantitation of the Rauscher leukemia virus (RLV) by means of an assay of cell colonies (consisting predominantly of nucleated erythrocytes) formed in the spleen of adult mice 6-8 days after RLV inoc. A linear relationship was shown between virus conc. and number of colonies in the spleen. Of the strains of mice tested for susceptibility to the colony forming unit (CFU) assay, SWR and Swiss mice showed the highest CFU titers, BALB/c, DBA/2 and C3H somewhat lower titers and C57BL/6 the lowest titer. Intravenous inoc. gave an av. CFU titer 10x higher than i.p. inoc.

65-517 OCCURRENCE OF MAMMARY TUMORS IN MICE CARRYING THE MAMMARY TUMOR AGENT IN DIFFUSION CHAMBERS. (E.) Merwin, R. M. (NCI, Bethesda), L. W. Redmon and G. H. Algire. J. Nat. Cancer Inst. 33(1):119-133, 1964.

Mammary tumor (MT) tissue from spontaneous MT in mice with or without the milk agent (MA) was sealed between Millipore membrane filters with pores of various size and placed i.p. in MA-free 4-8-week-old mice susceptible to MA-induced MT. Many MT arose when chambers had coarse pores (0.30 or 0.45 µ in diameter), but few were induced by fine-pore (0.10 µ or less) chambers. MT was induced whether the donors were strain C3H and the hosts BALB/c mice or vice versa. MT incidence was almost identical in coarse-pore chambers regardless of whether tumor tissue was placed inside or outside; fewer tumors appeared when suspensions of approx. equal amounts of tumor tissue were inj. i.p. No tumors were seen when spontaneous MT tissue from presumably MA-free C3H mice was placed in coarse-pore chambers in BALB/c mice. (See also CRA 1(6): #1045, 1963.)

65-518 IMMUNITY AND VIRAL CARCINOGENESIS. EFFECT OF THYMECTOMY ON POLYOMA VIRUS CARCINOGENESIS IN MICE. (E.) Malmgren, R. A.

(NCI, Bethesda), A. S. Rabson and P. G. Carney. J. Nat. Cancer Inst. 33(1):101-104, 1964.

In a study of immunity, two strains of polyoma virus (PV) were used, S-PV (highly carcinogenic) and M-PV (weakly carcinogenic). Newborn C57BL/6JN mice, known to be resistant to PV, were thymectomized and inj. s.c. with S-PV (0.05 ml; 107.2 TCID₅₀/ml) on the day of surgery; newborn C3H/Bi mice, highly susceptible to PV, were thymectomized and given M-PV (0.05 ml; 105.1 TCID₅₀/ml) on the day of surgery. Sham-operated mice of both strains were given the corresponding virus inj. In both experiments the thymectomized animals developed a significantly greater number of tumors than did the sham-operated controls. It is concluded that thymectomy impairs the immunologic capabilities of the host.

65-519 CHROMOSOMAL ABERRATIONS IN VIRAL LEUKEMOGENESIS. I. FRIEND AND RAUSCHER LEUKEMIA. (E.) Tsuchida, R. (Albert Einstein Med. Ctr., Philadelphia, Pa.) and M. A. Rich. J. Nat. Cancer Inst. 33(1):33-47, 1964.

Chromosomal alterations were studied in HaICR Swiss mice inoc. i.p. with 0.2 ml of undiluted Friend virus or a 10⁻³ dilution of Rauscher virus. In the early preleukemic period of splenic hyperplasia (7-41 and 11-30 days for Friend and Rauscher viruses, resp.) there was an increased incidence of secondary constrictions and a chromosome number of 40, with minimal variation about the diploid mode. The late leukemic period (50-65 and 39-253 days, resp.) was characterized by an increase in chromosome number and the incidence of aberrations. An inverse relationship between hyperdiploidy and the incidence of distinct secondary constrictions was observed.

65-520 STUDIES ON BOVINE OCULAR SQUAMOUS CARCINOMA ("CANCER EYE"). XV. HERITABILITY OF SUSCEPTIBILITY. (E.) Vogt, D. W. (Dept. Anim. Sci., Iowa State U., Ames) and D. E. Anderson. J. Hered. 55(3):133-135, 1964.

Based on data from 2,087 Hereford cattle representing 735 sire groups and 31 locations, the heritability of susceptibility to "cancer-eye," estimated by paternal half-sib analyses of variance, was found to be 0.06, 0.11, and 0.24 for age groups 40-69, 70-99, and 100+ mo., resp. Differences among the estimates are believed to reflect age differences in lesion manifestation.

65-521 CONTRIBUTIONS TO VIRAL GENESIS OF SINGLE SKIN AND ORGAN TUMORS. (Ger., Abstract) Melczer, N. Klin. Med. (Wien) 19(7):327-328, 1964.

A possible viral etiology of human tumors is described. By inoc. of cell-free filtrates into tissue cultures and by electron optical methods,

the author was able to determine regularly the presence of nuclear viruses (NV) in basal and prickle cell carcinomas of the skin. NV were also present in mouse benzpyrene-induced papillomas. In condylomata acuminata, papova virus (PV)-cell types were found. Of 30 cases of leiomyoma uteri, 85% showed NV belonging to the PV group. This virus was cytopathogenic for HeLa cells. In the nuclei of HeLa cells, virus particles were sometimes arranged in crystal-like rows. In the discussion, J. Söltz-Szöts reported that he could not find any CPE after inoc. of HeLa-cells with filtrates from skin carcinomas or warts. (See also CRA 1(12):#2058, 1963.)

- 65-522 PHYSICOCHEMICAL PROPERTIES OF POLYOMA VIRUS IN RELATION TO ITS BIOLOGIC ACTIVITY. (Ger., Abstract) Cramer, R. Krebsarzt 19(4):289, 1964.

Density gradient electrophoresis studies of SE polyoma virus showed that particles of the same electrophoretic mobility have not only carcinogenic, but cytolytic and hemagglutinating properties as well. Thus, the physicochemical properties of the virus could not indicate its biologic properties. (See also CRA 1(4):#713, 1963.)

- 65-523 STUDIES ON THE POLYOMA VIRUS. (Ger., Abstract) Weil, R. Krebsarzt 19(4):289, 1964.

The DNA structure of polyoma virus was examined and clarified. A special method was used in which the closed-ring structure was ruptured, and subsequent variations in the biologic activity of the DNA molecule were noted. The closed-ring form was oncogenic for certain animals, but the opening of the ring rendered the molecule oncogenic for animals in which only an inflammatory effect was noted previously. In the absence of a "ring-rupturing" enzyme, the virus is not oncogenic. (See also CRA 1(2):#250 and #251; and ibid., (8):#1554, 1963.)

- 65-524 BEHAVIOR OF ALKALINE PHOSPHATASE OF GRANULOCYTES IN WORKERS OF CHEMICAL INDUSTRY AND RADIOLOGISTS. (Pol.) Pawelski, S. (Dept. Intern. Dis., Inst. Hemat., Warsaw, Poland), E. Wicherzycka, B. Mdzewski and S. Roszkowski. Pol. Tyg. Lek. 19(38):1433-1435, 1964.

The average score of granulocytic alkaline phosphatase (GAP) per 100 granulocytes of various subjects was: 30 normal, 21.96; 77 radiologists, 20.66; 32 exposed to benzene or ammonia, 20.35; 30 exposed to toluene, xylene, formaldehyde, aniline dyes, and azo dyes, 9.96. Thus, only the latter group showed a statistically significant decrease in GAP activity, but no clinical nor hematologic symptoms. With respect to the GAP activity, no correlation could be found to the duration of

exposure to the leukemogenic conditions nor to the degree of leukocytosis. A review of the causes of increased or decreased (GAP) activities is tabulated.

- 65-525 A DIFFERENCE IN SUSCEPTIBILITY TO LYMPHOID LEUKOSIS VIRUS AND ROUS SARCOMA VIRUS BETWEEN CELLS FROM TWO INBRED LINES OF DOMESTIC FOWL. (E.) Payne, L. N. (Houghton Poultry Res. Station, Huntingdon, England) and P. M. Biggs. Nature (London) 203:1306-1307, 1964.

Both the chorioallantoic membranes and tissue culture cells of the C line of inbred Reaseheath fowl, more resistant to Rous sarcoma virus (RSV) Bryan strain than those of the I strain, showed similar susceptibility to the lymphoid leukosis virus (LLV; strain HPRS-F45), previously found to induce resistance to RSV. Extracts of C and I cells exposed to LLV, added to a culture of Brown Leghorn cells sensitive to RSV and lacking any resistance-inducing factor, when challenged with RSV, showed that C cells required 10⁻¹ to 10⁻³ dilutions to produce resistance-inducing factor, while I cells required only 10⁻⁷ LLV dilution. This correlated RSV response, if valid for other strains of leukosis virus, could be used to select fowl strains genetically resistant to LLV.

- 65-526 SUPPRESSION OF THE RESISTANCE OF MICE TO THE POLYOMA VIRUS CONNECTED WITH LYMPHATIC TISSUE DESTRUCTION FOLLOWING INJECTION OF TISSUE EXTRACTS FROM SHEEP SUFFERING FROM PULMONARY ADENOMATOSIS. (E.) Ter-Grigoriev, V. S. (Dept. Immun., N. F. Gamaleya Inst. Epidemiol. Microbiol., Moscow, USSR) and I. S. Irin. Neoplasma (Bratisl.) 11(1):27-35, 1964.

After infection of newborn CC57BR or C57BL mice with polyoma virus (PV), none developed tumors and cysts occurred in only a very few. Inj. of sheep pulmonary adenomatosis (SPA) tissue extracts into similar mice produced many cystic lymph node lesions but no tumors. Inoc. of day-old mice with both agents (PV + SPA) elicited a pronounced destructive (cystogenic) and oncogenic effect, especially in CC57BR mice. After 2-3 mo. cysts developed in 93% of survivors; in 60% of these cyst-bearers multiple tumors were found, especially in the parotid gland, thymus, and lungs. Admin. of either a PV-specific antiserum, or inactivation of SPA by heating, suppressed development of both cystic disease and tumors. It is concluded that the loss of resistance to PV following admin. of both PV + SPA was due to the destruction of lymphatic tissue (primarily the thymus) with consequent failure to develop immunologic competence.

- 65-527 PHYSICAL INTERACTION OF A MURINE LEUKEMIA VIRUS WITH INFLUENZA VIRUS IN VITRO. (E.) O'Connor, T. E. (NCI, Bethesda) and F. J. Rauscher. Science 146:787-790, 1964.

Incubated mixtures of Rauscher murine leukemia virus and influenza virus PR8 retained apparently unchanged the capacity of the former to induce splenomegaly in mice and the egg infectivity and hemagglutinating capacity of the latter. However, density-gradient centrifugation showed this mixture to consist primarily of a new interviral substance with a density gradient intermediate between those of its component viruses and an intermediate sedimentation rate. Chicken erythrocytes, which adsorb little Rauscher virus, readily adsorbed both the Rauscher and the influenza components of the interviral product. This interviral substance appeared to be a product of true fusion by mutual coalescence of the limiting membranes of both viruses.

- 65-528 ELECTRON MICROSCOPIC STUDIES OF NUCLEAR INCLUSIONS IN MENINGIOMAS. (E.) Robertson, D. M. (Dept. Path., Queen's U., Canada). *Am. J. Path.* 45(5):835-848, 1964.

Among 5 meningiomas studied by light and electron microscopy, intranuclear inclusions were found in 3/5, nuclear vacuoles in 4/5; 5/5 tumors contained a small number of nuclei which showed, in addition to readily identifiable nucleoli, small dense spherical bodies (about 0.5 μ diameter) surrounded by a narrow halo. Similar bodies were occasionally seen near the edge of nuclear vacuoles. These bodies did not possess a limiting membrane. No virus particles were observed.

- 65-529 BIOCHEMICAL STUDIES ON ADENOVIRUS MULTIPLICATION. VII. HOMOLOGY BETWEEN DNA'S OF TUMORIGENIC AND NONTUMORIGENIC HUMAN ADENOVIRUSES. (E.) Lacy, S. (Inst. Molec. Virol., St. Louis U. Sch. Med., Mo.) and M. Green. *Proc. Nat. Acad. Sci. USA* 52(4):1053-1059, 1964.

The DNA-agar technic was used to determine the degree of genetic relatedness among tumorigenic human adenovirus (TA) types 12 and 18 and nontumorigenic adenovirus (NA) types 2 and 4 (interactions of all 16 possible pairs, homologous, heterologous, and reciprocal of the 4 viral DNA's were studied). The DNA's of TA 12 and 18 showed extensive homology (hybridized 79% with each other). The DNA's of NA 2 and 4 were about half as related to each other as those of TA (hybridized only 35%). The DNA's of TA and NA showed least homology (hybridized only to the extent of 18-26%).

- 65-530 MULTIPLICATION OF RAUSCHER VIRUS IN CULTURES OF MOUSE KIDNEY CELLS. (E.) Peries, J. (Inst. Leukemia Res., Saint Louis Hosp., Paris), J. P. Levy, M. Boiron and J. Bernard. *Nature (London)* 203:672-673, 1964.

Newborn BALB/c mice were inoc. with spleen extract (0.1 ml containing 10^4 - 10^6 ID₅₀, i.p.) from Rauscher virus-induced leukemic mice of the

same strain; 6-10 days later a cell suspension of their minced kidneys was inoc. on nutrient medium and cultivated for several mo. with semi-weekly change of medium. The virus produced no CPE in the kidney cells in which it multiplied. Tests with rat and mouse RBC showed no hemagglutinating or hemadsorbing activity. No interference with the growth of a challenge dose of Sindbis virus was observed, nor was interferon demonstrable in the supernatants. Bioassays, however, proved the permanent presence of Rauscher virus in the cultures, since 100% of newborn mice inoc. with supernatants taken 32-71 days after culture initiation developed generalized leukemias (erythroblastic, myeloid or undifferentiated) after av. latency of 98-106 days. Control material from untreated mice never produced virus. The data show that leukemia viruses may be cultivated and can multiply in various kinds of cells, while pathologic transformation is found only in certain of these cell types.

- 65-531 THE PRODUCTION OF A VIRUS-INDUCED TUMOR IN THE CENTRAL NERVOUS SYSTEM OF MONKEYS. (E.) Ausman, J. I. (Dept. Neurosurg., Roswell Park Mem. Inst., Buffalo, N. Y.) and G. Owens. *J. Neurosurg.* 21(8):660-666, 1964.

Epigastric Yaba virus tumors, induced by s.c. inj. of Yaba tumor homogenate, were excised from 6 rhesus monkeys 6-18 days after inj. and small tumor pieces were transplanted to their brains. Intracranial tumors developed in 4/6; 3/4 showed paresis of the contralateral leg and death occurred after 36-47 days. Neither subarachnoid and intracerebral inj. of Yaba virus into other rhesus monkeys, nor inj. of Yaba virus into a foreign body (talcum) reaction lesion of the brain produced CNS tumors, although hosts were observed for 1 yr. The blood-brain barrier and other factors possibly affecting CNS tumor production are considered.

- 65-532 EXPRESSION OF POLYOMA-INDUCED CELLULAR ANTIGEN(S) IN HYBRID CELLS. (E.) Defendi, V. (Wistar Inst. Anat. Biol., Philadelphia, Pa.), B. Ephrussi and H. Koprowski. *Nature (London)* 203:495-496, 1964.

Suspensions of viable Py-198-1 and M-109 cells were inoc. into 3-4-month-old C3H/He and A/J mice intracerebrally (up to 10^6 cells) or s.c. (up to 5×10^6 cells); some of these mice were irradiated with 450 r on the day of inoc. No tumors occurred during an observation period of 6 mo. C3H/BI and C57/BL mice were inoc. with 7.5×10^6 washed cells of Py-198-1 or M-109, twice s.c. and once i.p. at 1 week intervals. One wk. after the final immunization, the mice were challenged s.c. with the isologous polyoma-tumor cell suspension free of virus. Tumor growth was recorded and after 3 mo., the mice were tested for the presence of polyoma virus (PV) hemagglutination inhibiting activity in their sera. All the sera were negative, confirming that PV was not

present in the immunizing cells nor in the challenging tumors. In comparison to non-treated mice, those pre-immunized with M-109 and Py-198-1 cells showed resistance to transplants of the resp. isologous tumor cells; also, the latent period was longer. Immunization with Py-198-1 cells seemed more effective than M-109 cells. Resistance was more pronounced in C3H/BI than in C57/BL mice. It was concluded that the polyoma-induced transplantation antigen(s) was(were) present in the hybrid as well as in the parental polyoma-transformed cells. Also, sera obtained from hamsters and mice bearing large polyoma-induced virus-free tumors fix complement when tested with saline extracts of these tumors; this reaction is specific, since these sera do not react with the original inducing virus, nor with extracts from tumors induced with different viruses in the same species (although they will cross-react with the tumors induced by the same virus in different species). A typical complement-fixation test with parental and hybrid cells against serum from mice bearing polyoma tumor is tabulated, showing that even undiluted extracts of the N.C.T.C. 2555 cells and of a line L cells did not fix complement, whereas extracts of Py-198-1 cells fixed complement at a dilution of 1:16, and the hybrid M-109 and a clone derived from it (M-3) were positive at a dilution of 1:4. Thus, the complement-fixation test for polyoma-induced antigen indicates that the hybrid line presents some of the characteristics of one of the parental lines.

- 65-533 BOVINE LYMPHOSARCOMA IN CALIFORNIA. II. THE THYMIC FORM. (E.) Dungworth, D. L. (Dept. Path., U. California Sch. Vet. Med., Davis), G. H. Theilen and J. Lengyel. Path. Vet. 1(4):323-350, 1964.

Fourteen animals (age 7-30 mo.; 10 Hereford, 2 Jersey, 1 Aberdeen Angus, 1 Holstein Friesian) with bovine lymphosarcoma are described in which the primary lesion appeared to be in the thymus. Frank leukemia was seen in only 1 animal in spite of the frequent occurrence of bone marrow infiltration. Most of the cases were seen in Hereford cattle, but whether this prevalence is real or apparent cannot be decided from available data.

- 65-534 ULTRASTRUCTURAL RELATIONSHIP OF A VIRUS TO MITOCHONDRIA: COMPARISON OF VIRAL DEVELOPMENT IN BHK 21/13 CANCER-INDUCED CELLS, AND IN H54 CELLS. (Fr.) Thomas, J. A. (Lab. Cell. Biol., U. Paris, Sorbonne). C. R. Acad. Sci. (Paris) 258(24)(Group. 15):6018-6021, 1964.

Electron microscope studies of strain BHK21/13 cells, capable of rapid induction of enormous tumors in the Syrian hamster by i.p. inoc., revealed the presence of abundant viruses forming cytoplasmic masses and altering the mitochondria. The virions were round or slightly

elliptical, measured 80 mμ, had a single capsule and nucleoid measuring 40 mμ and showed no similarity with the polyoma virus. The characteristic virogenesis by fibrillar differentiation of the mitochondria is amply traced. Similar studies of cancer cells from hamster tumors induced by strain BHK21/13 showed the persistence of virogenesis, which, however, did not lead to the formation of complete and isolated virions, as though because of inhibition or scarcity of virus. However, these cells showed abundant fine granules of unknown nature. Cells from strain H54, derived from the BHK21/13-induced hamster tumors, showed viral colonies formed by fibrillar differentiation of the mitochondria as well as large members of fine granules. (See also the following abstract.)

- 65-535 A COMPARATIVE STUDY OF THE MITOCHONDRIA AND KARYOTYPES OF BHK21/13 CELLS AND OF H54 CANCER CELLS DERIVED FROM THEM. (Fr.) Thomas, J. A. (Lab. Cell. Biol., U. Paris, Sorbonne), J. P. Fouquet, E. Hollande, M. Pouchelet and D. Vallet. C. R. Acad. Sci. (Paris) 258(25)(Group. 14):6273-6276, 1964.

Electron microscope studies revealed the same fibrillar mitochondrial degeneration and viral plaque development in both BHK21/13 cells and H54 cancer cells derived from them. Physiological studies showed an altered Krebs cycle in relation to mitochondrial degeneration in both types of cells. Chromosome studies indicate a male karyotype (XY) for BHK21/13 cells and a female karyotype (XX) for H54 cells, while other characteristics (heteroploidy with predominant hypoploidy; fragmentation; chromosome loss, dicentric chromosomes) were the same for both strains. (See also the preceding abstract.)

- 65-536 RELATIONSHIP BETWEEN TRANSFORMED CELLS IN VITRO AND PRIMARY TUMORS IN VIVO INDUCED BY POLYOMA VIRUS IN HAMSTERS. (E., Abstract) Defendi, V. (Wistar Inst., Philadelphia, Pa.) and J. M. Lehman. Proc. Am. Assn. Cancer Res. 5(1):14, 1964.

In the case of polyoma virus, "early" transformed cells *in vitro* were found to be similar to primary and "late" transformed cells to transplantable tumors. (See also CRA 1(4):#723, 1963.)

- 65-537 THE REPLICATION OF MOLONEY LEUKEMIA VIRUS BY A TRANSPLANTABLE CELL LINE. (E., Abstract) Garretson, A. L. (Chas. Pfizer Co., Inc., Maywood, N.J.) and S. A. Mayyasi. Proc. Am. Assn. Cancer Res. 5(1):21, 1964.

In vitro studies show that leukemic cells from BALB/c mice with Moloney leukemia virus (MLV)-induced lymphoid leukemia contain highly infective MLV particles capable of rapid replication. In

isologous mice, the presence of MLV has been demonstrated for more than 10 transplant generations.

- 65-538 PRESENCE OF VIRUS-LIKE PARTICLES IN MIXED CULTURES OF MOUSE SARCOMA S 180 AND CHICK EMBRYO MESONEPHRON. (Fr.) Zagury, D. (Lab. Exp. Embryol., Coll. France, Paris) and D. Cuminge. *C. R. Acad. Sci. (Paris)* 258(21) (Group. 14):5291-5293, 1964.

Electron microscope studies have revealed the presence of 2 types of viral particles in mixed cultures of S180 sarcoma from the C57 mouse and chick embryo mesonephron: spherical intracellular particles 40-50 μ in diameter and containing a central body; less frequent spherical extracellular particles measuring 80 μ in diameter with a less dense space around its central body. Both types were also found in sarcoma S180 fragments *in situ*, but in greater numbers. Explants treated with cortisone showed an increased number of both intra- and extracellular particles. In addition, mixed cultures showed another type of virus particle, i.e., round, extracellular, measuring 100 μ in diameter, with a central nucleoid surrounded by a wide, less dense ring, located near or in contact with the external cell membrane. This type of particle was not found in sarcoma S180 *in situ*, nor in KB cells; a mesonephron origin is suggested, although they are not found in mesonephron cultures alone.

- 65-539 OCCURRENCE OF SOLUBLE ANTIGEN IN THE PLASMA OF MICE WITH VIRUS-INDUCED LEUKEMIA. (E.) Stück, B. (Clin. Pediat., Free U. Berlin), L. J. Old and E. A. Boyse. *Proc. Nat. Acad. Sci. USA* 52(4):950-958, 1964.

The plasma of infected BALB/c mice contains an antigen, separable from infective virus, that has the same specificity as that of Rauscher leukemia cells. The soluble antigen is adsorbable onto certain cells which renders them susceptible to lysis by specific cytotoxic Rauscher antiserum (RA). The transplanted radiation-induced leukemia ERLD (C57BL/6) became sensitive to RA after the cells had been incub. in the infective plasma of BALB/c mice with Rauscher disease. The property of sensitizing ERLD cells to lysis by RA exists in both serum and plasma. Absorption of RA with ERLD cells sensitized by adsorbed Rauscher antigen removed all cytotoxic activity both for antigen-sensitized ERLD cells and for leukemias induced by Rauscher virus. ERLD cells incub. in the plasma of mice with Moloney leukemia were sensitized to lysis by the Moloney as well as by the Rauscher antisera. Both Friend and Rauscher antisera were cytotoxic for ERLD cells incub. in the plasma of mice infected with Friend virus. These cross-reactions provide further evidence that leukemias induced by the Friend, Moloney, and Rauscher virus are immunologically related. The plasma of mice with

either primary or transplanted Gross leukemias contained no antigen reactive with RA. (See also CRA 2(7):#1310, 1964.)

- 65-540 SELECTIVE GROWTH IN AGAR OF HAMSTER CELLS TRANSFORMED BY POLYOMA VIRUS. (Fr.) Montagnier, L. (Radium Inst., Paris) and I. Macpherson. *C. R. Acad. Sci. (Paris)* 258(16) (Group. 14):4171-4173, 1964.

Selective growth in agar of the fibroblast line BHK21/13 of hamster cells infected by polyoma virus has been found to be a useful and sensitive method for the determination of the transforming power of the virus. Of 59 colonies formed after infection, 55 produced cell cultures whose characteristics were similar to those of transformed cells. Transformation was detected with infectious viral doses less than 1 PFU/cell; the number of colonies showed no increase with doses greater than 500 PFU/cell. (See the following abstract and CRA 2(6):#1120, 1964.)

- 65-541 CELL TRANSFORMATION BY DIFFERENT FORMS OF POLYOMA VIRUS DNA. (E.) Crawford, L. (Inst. Virol., Glasgow, Scotland), R. Dulbecco, M. Fried, L. Montagnier and M. Stoker. *Proc. Nat. Acad. Sci. USA* 52(1):148-152, 1964.

The transforming ability of DNA extracted from purified polyoma virus was examined by both sucrose and CsCl density gradients. Transformation of BHK21 hamster cells exposed to 0.1 ml of DNA was observed for both the open (slow band) and closed (fast band) configurations. Whether component III of the closed molecule can produce transformation has not yet been established. The findings imply that the early stages of virus host cell interaction are similar, whether later leading to transformation or to plaque formation. (See also the preceding abstract.)

- 65-542 PROLIFERATION OF ROUS SARCOMA VIRUS (RSV) IN CELL CULTURE. EFFECT OF p-FLUOROPHENYLALANINE. (E., Abstract) Eidinoff, M. L. (Sloan-Kettering Inst. Cancer Res., Rye, N. Y.), A. Perez and B. Bates. *Proc. Am. Assn. Cancer Res.* 5(1):16, 1964.

5-Fluorophenylalanine (FPA; 5.5 mM) inhibited Rous sarcoma virus (RSV) proliferation in chick embryo fibroblasts not only during the eclipse phase shortly following virus adsorption, but also in cell populations actively producing RSV. This effect of FPA could be prevented by the simultaneous addition of phenylalanine.

- 65-543 ULTRASTRUCTURAL STUDY OF THE KREBS 2 ASCITIC CARCINOMA CELL: STAGES OF DEVELOPMENT IN THE PRESENCE OF THE TRANSMISSIBLE AGENT. (Fr.) Thomas, J. A. (Lab. Cell. Biol., U. Paris, Sorbonne). *C. R. Acad. Sci. (Paris)*

258(1)(Group. 14):393-396, 1964.

Electron microscope studies on ascites cells from the Krebs 2 ascitic carcinoma revealed the following structure: nucleoplasm with strands of dark granulations containing round or elongated inclusion bodies with a double membrane; evidence of direct passage into the cytoplasm of abundant nuclear material, whole inclusion bodies and rounded nuclear bodies; marked cytoplasmic alterations and presence of finely granular material; lipid particles; virus particles within virus-type bodies; alterations of the chondriosomes; intracytoplasmic colonies made up of virus-type particles (measuring 60 mμ) forming a solid network. These virus-type particles are identical in form, size and grouping to viruses previously described by the same authors in mouse carcinomas induced by inoc. of fractions from Krebs 2 carcinoma (see CRA 1(12):#2155, 1964). The genesis of these virus particles is extensively discussed.

65-544 ISOLATION OF ADENOVIRUS FROM HUMAN PULMONARY CARCINOMA. (Rum.)

Broniński, A., R. Demetrescu, G. Popescu, A. Malian and C. Cărpănișan. Stud. Cercet. Inframicrobiol. 15(3):269-272, 1964.

Five strains of adenovirus have been isolated on KB cells from 5 pts. with primary carcinoma of the lung. The strains behaved almost identically in their effect on the cell cultures (presence of pseudo-giant cells, amitoses, and incomplete, tri- and quadripolar Y mitoses). These forms were not found during isolation of adenovirus from the nasopharynx. The isolated viruses used as antigen, gave positive complement fixation reactions against the standard anti-APC type 5 antiserum.

65-545 TRANSPLANTABLE CELL CULTURE DEVELOPED FROM THE RAT (SHAY) CHLOROMA. (Hun.)

Hamar, M. (Clin. Derm., Pecs U. Med., Hungary) and S. Pácsa. Magy. Onkol. 8(3):137-140, 1964.

A method is described for the development of transplantable cell cultures from the Shay chloroma of the rat. The cultures obtained are a mixture of epitheloid cells and fibroblasts. Attempts at demonstrating cancerogenic activity by implanting cell cultures into rats were unsuccessful. The cultures do not sustain growth of either polio or Coxsackie virus strains, but proved an adequate culture medium for the herpes simplex virus obtained either from chick embryo or HeLa cell cultures.

65-546 COMPARATIVE PATHOGENESIS OF MURINE VIRAL LYMPHOMA. (E.) Siegler, R.

(Lab. Cancer Res., Albert Einstein Med. Ctr., Philadelphia, Pa.) and M. A. Rich. Cancer Res. 24(8):1406-1417, 1964.

Female 4-6-week-old Swiss ICR mice were inj. i.p. with cell-free supernatants of spleen homogenates of mice infected with either Friend or Rauscher viruses. Within 3-50 days, essentially similar host responses were induced by both viruses and consisted of a marked proliferation of splenic reticulum cells and subsequent dissemination to the liver and peripheral circulation. Thymic lymphomas, which were superimposed on the splenic lesions, developed after 78-80 days in some of either group of animals with Friend or Rauscher leukemias. Comparison of these thymic lymphomas with those in AKR mice or mice infected with the Rich agent showed that in all cases the lymphoma evolved from only 1 of the 2 thymus glands, and the appearance of tumor was preceded by a marked unilateral loss of lymphocytes. (See also CRA 2(4):#789, 1964.)

65-547 PROPERTIES OF A STRAIN OF POLYOMA VIRUS ISOLATED FROM THE LEUKEMIC-INFECTED ORGANS OF AN AKR-GIF MOUSE. (E.) Castelli, L. (Superior Inst. Health, Rome) and A. M. Jemolo. Oncologia (Basel) 18(1):21-32, 1964.

The isolation of polyoma virus/ISS from an AKR-Gif leukemic mouse is described in detail. *In vitro*, this virus was similar to the polyoma virus, but its *in vivo* behavior differed from that of previous strains. When inoc. s.c. into hamsters, it showed high oncogenic capacity and produced polymorphic or spindle cell sarcomas of the epithelium and a high percentage (81.2%) of hepatic lesions described as cavernous angiomas which hemorrhaged and usually caused death. In Swiss/ISS mice, inbred C57BL/6/AR mice and Wistar rats, its oncogenicity was low, producing only 2 tumors in a total of 126 animals. A polymorphic spindle cell tumor of the kidney developed in 1 rat, and a tumor of the parotid gland occurred in 1 mouse. Characteristics of the virus are discussed.

65-548 ANTIGENIC BEHAVIOR OF MOLONEY LYMPHOMAS: INDEPENDENCE OF VIRUS RELEASE AND IMMUNOSENSITIVITY. (E.) Klein, G. (Inst. Tumor Biol., Karolinska Inst. Sch. Med., Stockholm, Sweden) and E. Klein. Science 145:1316-1317, 1964.

Tests with 18 different lines of Moloney lymphoma virus in A x C57BL F₁ mice showed that all tumor cells released considerable amounts of virus 35 days after inoc., though they differed in the amount of mouse antibody elicited. There were wide differences, however, in sensitivity to virus-induced graft rejection, some being highly, but not completely, resistant to established isografts. The capacities of a tumor to form antibodies against Moloney cells and to sensitize against Moloney isografts are parallel, since both are due to release of infectious virus. Sensitivity to virus-induced graft rejection, however, is independent of virus release and may be due to development of new cellular antigens. (See also CRA 2(5):#931, 1964.)

65-549 OBSERVATIONS ON INDUCTION OF RESISTANCE TO ROUS SARCOMA CELL ANTIGENS IN HAMSTERS. (E.) Radzichovskaja, R. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci. Moscow). Nature (London) 204:393, 1964.

Adult golden hamsters were inoc. 2-3 times i.p. and s.c. with Rous sarcoma virus (Carr strain). After 7-24 days, the immunized hamsters and controls were inoc. s.c. with sarcoma cells. The number of animals with tumors among the immunized and control hamsters, resp., was: at 4.5×10^3 cells per inoc., 0/27 and 0/22; at 4.5×10^4 cells per inoc., 4/27 and 9/22; at 4.5×10^5 cells per inoc., 8/27 and 18/22; at 4.5×10^6 cells per inoc., 24/27 and 22/22. Therefore, immunization with Rous sarcoma virus induced some degree of resistance to the sarcoma cell antigens.

65-550 QUANTITATIVE ANALYSIS OF FRIEND'S DISEASE IN TWO INBRED STRAINS OF MICE WITH EMPHASIS ON BONE MARROW RESPONSE. (E.) Ludwig, F. C. (Dept. Path., U. California Sch. Med., San Francisco), L. L. Bostick and M. L. Epling. Cancer Res. 24(8):1308-1317, 1964.

A more detailed account of the paper reported in CRA 1(5):#958, 1963.

65-551 SOME IMMUNOLOGICAL CROSS-REACTIONS AMONG THE MURINE LEUKEMIA VIRUSES. (E., Abstract) Fink, M. A. (NCI, Bethesda). Proc. Am. Assn. Cancer Res. 5(1):18, 1964.

65-552 MORPHOLOGICAL OBSERVATIONS BEARING ON THE VIRAL ETIOLOGY OF THE LUCKE RENAL ADENOCARCINOMA OF RANA PIPIENS. (E., Abstract) Darlington, R. W. (St. Jude Hosp., Memphis, Tenn.), A. Granoff and W. Johnson. Proc. Am. Assn. Cancer Res. 5(1):13, 1964.

65-553 A COMPARISON OF METHODS FOR PREPARATION OF SHOPE PAPILLOMA VIRUS. (E., Abstract) Hodes, M. E. (Dept. Med., Indiana U. Med. Ctr., Indianapolis) and L. E. Beaty. Proc. Am. Assn. Cancer Res. 5(1):27, 1964.

65-554 CROSS IMMUNITY ELICITED BY TUMORS INDUCED BY A LEUKEMIA VIRUS.

(E., Abstract) Breyere, E. J. (Dept. Biol., American U., Washington, D. C.) and W. P. Jordan. Proc. Am. Assn. Cancer Res. 5(1):8, 1964.

Reported is the demonstration in Balb/c mice of immunity and antigenic relationships of lymphoid tumors induced by a virus isolated from C3H plasma cell tumor 70429.

65-555 PHASE-CONTRAST MICROSCOPY OF POLYOMA-TREATED RAT EMBRYO CELLS.

(E., Abstract) Buckley, I. K. (Pasadena Found. Med. Res., Cal.). Proc. Am. Assn. Cancer Res. 5(1):9, 1964.

65-556 APPLICATION OF IMMUNOFLUORESCENCE TO THE STUDY OF HUMAN LEUKEMIA. (E.)

Fink, M. A. (NCI, Bethesda), R. A. Malmgren, F. J. Rauscher, H. C. Orr and M. Karon. J. Nat. Cancer Inst. 33(3):581-588, 1964.

The electron microscopic identification of virus-like particles contained in the conc. plasma of pts. with leukemia prompted use (in the present study) of plasmas containing similar particles as antigens to produce an antiserum in rabbits. Following its absorption with normal human antigens and fluorescein isothiocyanate labeling, this serum was noted to react specifically with various cells in the bone marrow and peripheral blood of a significant proportion (49/72) of pts. with leukemia, but did not react with the leukocytes of 25 nonleukemic individuals. A cross-reaction with a similar antibody prepared against the Rauscher murine leukemia virus occurred in the bone marrow and peripheral blood cells from some leukemic pts., and especially with cells from a pt. with erythroleukemia. A marked reaction with anti-human leukemia fluorescent antibody and a lesser reaction with the anti-murine antibody was noted in tissue cultures of Burkitt's lymphoma. No reaction with either serum occurred in HeLa cells infected with herpes simplex or herpes zoster viruses. These results are believed to lend evidence to the viral etiology of human leukemia and suggest that antigenic similarities exist among strains of these viruses infecting different species.

See also abstract nos.: 416-418, 424, 611, 615, 621, 633

EPIDEMIOLOGY AND BIOMETRY

- 65-557 CANCER IN AFRICA. (E.) Taylor, J. (Myumi Hosp., Tanganyika). Brit. Med. J. 2:121-122, 1964.

An analysis of the cancer site in 94 histologically proven cases in Myumi hospital from 1955-64. The commonest sites were cervix uteri (21 cases) and bladder (10), the latter suggesting a possible relationship to the ubiquitous *Schistosoma haematobium*. The small number of cases (5) of primary carcinoma of the liver does not reflect a true picture since most of these pts. were seen on an outpatient basis. Unlike the previous reports by the Kampala workers, prostatic carcinoma was relatively common (5). The relatively high incidence of choriocarcinoma (3) represents an incidence of about 1/500 deliveries; a similar trend in the incidence of hydatidiform mole was noted, a possible connection existing between the two.

- 65-558 MONTH OF BIRTH AND CANCER MORTALITY. (E.) Bailar, J. C. III (NCI, Bethesda) and J. M. Gurian. J. Nat. Cancer Inst. 33(2): 237-242, 1964.

A discussion of the data, extensively tabulated, with respect to possible differences in cancer incidence (including childhood leukemia) and mortality rates, according to the birth-month of 20,451 persons in Connecticut dying with cancer in 1957-61. No such differences could be established for either sex, for any age group, or for any of the sites or site groups studied.

- 65-559 THE METHODS OF SCIENTIFIC-STATISTICAL STUDY ON THE EPIDEMIOLOGY OF CANCER. (E.) Merkov, A. M. Acta Un. Int. Cancr. 20(3): 583-585, 1964.

The value of statistical methods of analysis in epidemiologic studies of cancer is examined with a view to the solution of the general problem of etiology and furthering the organization of fighting against it.

- 65-560 THE INCIDENCE OF MALIGNANT NEOPLASMS IN JAMAICA, WEST INDIES. (E.) Walter, D. C. (Dept. Path., U. West Indies, Jamaica), G. Bras and S. E. H. Brooks. Acta Un. Int. Cancr. 20(3):595-598, 1964.

Cancer incidence data collected in Jamaica (Kingston and St. Andrew) from 1955-1961 were compared to that for Denmark (1943-1947) and South Africa (1953-1955). The overall cancer incidence rate for males was the same in both Jamaica and Denmark, while that for females was higher in Denmark; cancer in both sexes was more common in Jamaica than in South Africa. Incidence of cancer of the buccal cavity and pharynx,

esophagus, liver (primary) and penis was higher in Jamaicans than in Danes; incidence of g.i., breast and skin cancers was higher among Jamaicans than among Bantus.

- 65-561 GEOGRAPHICAL CANCER PATHOLOGY IN EL SALVADOR GYNECOLOGICAL CANCER. (E.) Diaz-Bazan, N. (Dept. Surg., Rosales Hosp., San Salvador, El Salvador). Acta Un. Int. Cancr. 20(3):605-608, 1964.

A review (37 references) of the author's previous reports dealing with gynecological cancer in El Salvador from 1951-60. Eight cases of uterine cervix carcinoma associated with procidentia have been added to the author's own series, the largest ever reported in the literature. Prolapse does not protect against carcinoma in his opinion. The author recommends the following systematic investigations: (1) cervical carcinoma in young pts. (20 yr. on up), especially multipara; (2) the incidence of associated uterine prolapse and cervical carcinoma; (3) the high incidence of carcinoma of the penis (reported by others) in relation to the very high incidence of cervical carcinoma in El Salvador. (See also CRA 2(3): #541, 1964.)

- 65-562 THE PREVALENCE RATE OF MORBIDITY FROM CANCER IN A DEFINED POPULATION. (E.) Barclay, T. H. C. (Allan Blair Mem. Clin., Regina, Saskatchewan, Canada). Acta Un. Int. Cancr. 20(3):620-622, 1964.

A study of the prevalence rate of cancer morbidity based on the records of the Saskatchewan Cancer Commission 1946-60. The rate increased over the 3 successive quinquennial periods from 314 to 511/100,000 (males), and from 256 to 366 (females). For pts. 35 yr. or older (both sexes), there was an increase from 761/100,000 (1946-50) to 1,112/100,000 (1956-60). For males the crude rate rose from 806 to 1,266/100,000 and for females 711 to 957. In the last 5 yr., it was found that in this age group, 1.3% of all males had active cancer, compared with 1.0% in females. Included are tabulations of data including the comparison of the distribution of cancers by site.

- 65-563 SMOKING AND ORAL PATHOLOGY: AN EPIDEMIOLOGIC STUDY. (E.) Taubenhau, L. J. (Dept. Public Health, Brookline, Mass.), E. C. Maloof and J. W. Scanlon. J. Am. Geriatr. Soc. 12(9):871-876, 1964.

In a study of 1,108 adults (age 24-91 yr.) screened in the oral cancer detection clinic of the Brookline Health Dept., 126 had oral pathology: 27 (2.4%) high cancer-risk lesions; 6 were malignant (occurrence rate = 5.4/1,000) including 5 squamous cell carcinomas of the buccal mucosa and 1

epidermoid lip carcinoma. The age distributions in the normal and abnormal groups were similar, the largest number of pts. being in the 60-69 decade, although the median age for the abnormal group was 10 yr. higher. Abnormal males were most numerous in the 50-59 and females in the 60-69 decade. Male smokers were 3x more frequent than female smokers in both groups. Smoking habits in relation to clinical findings showed that among smokers 433 (86%) were normal and 72 (14%) were abnormal; among nonsmokers 549 (91%) were normal and 54 (9%) were abnormal. Of the pts. with abnormal findings, 25% smoked more than 1 package of cigarettes daily, compared with 12% of pts. with normal findings. The percentages for those who smoked less than 1 package of cigarettes daily, cigars, or pipes, were the same in both abnormal and normal groups. Biopsies of pts. with abnormal findings revealed 19 smokers and 8 nonsmokers, with premalignant or malignant lesions and 52 smokers and 47 nonsmokers with neither type of lesion. Neither the use of dentures or alcohol, nor a family history of cancer appeared to be similarly related to the presence of oral abnormalities.

- 65-564 ON THE GEOGRAPHICAL DISTRIBUTION OF CARCINOMA OF THE STOMACH IN NORWAY. (E.) Mork, T. (Norwegian Radium Hosp., Oslo). Acta Un. Int. Cancr. 20(3):626-628, 1964.

Of 8,927 cases of stomach carcinoma in Norway (1953-58), 5284 occurred in males and 3643 in females; 52% and 42%, resp., were found in subjects <70 yr. of age. This report is limited to the male cases. Standardized morbidity ratio (SMR; 100x the observed number:the number expected from age-specific rates for the country) decreased from urban over-densely populated to rural areas. Except in Northern Norway, the rural districts have SMR <100; for urban and densely populated areas the SMR was 88-126 and 74-115, resp. There were fewer geographical differences in pts. <70 yr. In the older age-group, there were larger differences between both districts and different types of communities. Emphasis is placed on methodological problems in comparing cancer morbidity rates from different areas and on the validity of such data for studies of tumor etiology.

- 65-565 ON THE SIGNIFICANCE OF STATISTICS ON PRECANCEROUS LESIONS OF THE URINARY BLADDER AND THE UTERINE CERVIX. (E.) Clemmesen, J. (Dept. Path., Finsen Inst., Copenhagen, Denmark). Acta Un. Int. Cancr. 20(3):693-695, 1964.

The author reviews (4 references) the increase in bladder papilloma and carcinoma incidence seen in Copenhagen and compares two studies reported in CRA 1(1):#19, 1963 on precancerous lesions of the uterine cervix.

- 65-566 EPIDEMIOLOGICAL STUDIES OF CANCER IN SINGAPORE. (E.) Shanmugaratnam, K. (Dept. Path., U. Singapore, Malaysia). Acta Un. Int. Cancr. 20(3):758-762, 1964.

In the island of Singapore, the crude yearly cancer mortality rate per 100,000 has increased from 12.6 in 1906-1910 to 51.6 in 1954-1958 and is mainly due to steady improvement in diagnostic facilities and other reasons. However, in comparing the data with corresponding data from other countries, allowance must be made for such factors as the high youth ratio of the Singapore population, individual racial practices (see CRA 1(2):#304, 1963) and poor mortality records. Cancers of the nasopharynx, liver and esophagus (especially in the Chinese) and buccal cavity (especially in Indians) have a relatively higher frequency in Singapore than in Western countries, while cancers of the prostate and breast have a lower frequency.

- 65-567 THE FREQUENCY OF HEPATOCELLULAR CARCINOMA AMONG THE INDIGENOUS AND IMMIGRANT CHINESE IN SINGAPORE. (E.) Shanmugaratnam, K. (Dept. Path., U. Singapore, Malaysia). Acta Un. Int. Cancr. 20(3):659-660, 1964.

In Singapore, hepatocellular carcinoma occurred with relatively greater frequency among the immigrant China-born Chinese (91.7%) than among the indigenous Singapore-born Chinese (3.1%) or immigrant Chinese born elsewhere including Malaya (5.2%). This was deduced by comparing the place of birth of hepatocellular carcinoma cases seen at necropsy with cases dying from trauma and miscellaneous diseases. Further studies are necessary in order to explain these differences.

- 65-568 COFFEE CONSUMPTION AND MORTALITY FOR PROSTATE CANCER. (E.) Takahashi, E. (Dept. Hygiene, Tohoku U. Sch Med., Sendai, Japan). Tohoku J. Exp. Med. 82(3):218-223, 1964.

Based on 5-year estimates (1955-59), there was a significant correlation ($P = <0.001$) between the av. consumption of coffee (in 20 non-coffee-producing countries) and the age-adjusted mortality due to prostatic cancer, but no correlation to deaths from cancer of the breast, uterus, stomach, intestine and rectum, ovary or bladder (in 13 countries). Sugar consumption was found to be significantly correlated with prostate cancer, as well as with cancer of the breast, intestine, ovary and rectum. Statistical studies of individual cases of prostatic cancer and controls are needed to confirm the data in this report.

- 65-569 STUDIES ON NASOPHARYNGEAL CARCINOMA IN THE CHINESE. STATISTICAL AND LABORATORY INVESTIGATIONS. (E.) Liang, P.-C. (Dept. Pathoanat., Chung Shan Med. Coll., Canton). Chin. Med. J. 83(6):373-390, 1964.

In a review (69 references) and discussion on nasopharyngeal carcinoma in China, incidence, histogenesis, histologic types, histochemistry, biochemistry, cytology and animal experimentation studies are presented. The author noted that the total number of reported cases is 12,000 (proved by biopsy) and the incidence of nasopharyngeal carcinoma is particularly high in South China where it is the most frequent malignancy, with a percentage among all malignancies in Canton and Nanning of 25.2% and 18.4%, resp. Although intranuclear and intracytoplasmic inclusion bodies in the carcinoma cells were found in some cases of nasopharyngeal carcinoma, conclusive evidence is still lacking concerning why there is such a high incidence among the Chinese.

65-570 RELATIONSHIP BETWEEN CIGARETTES AND CANCER OF THE LUNG. (Sp.)

Pareja Coronel, A. (Ecuador Antituberc. Assn., Guayaquil). Rev. Esp. Tuberc. 33(347):71-78, 1964.

A review (7 references) and discussion of the data relative to the increasing evidence which supports the existence of a causal relationship between cigarette smoking and cancer of the lung. The relationship has received further confirmation by the demonstration of the existence of a high incidence of bronchial alterations (hyperplasia, loss of cilia, metaplasia and appearance of cells with atypical nuclei) found at autopsy in smokers who had died of causes unrelated to lung cancer. There was a direct relationship between amount of smoking and length of exposure and the severity of lesions. Cigar and pipe smokers presented lesser bronchial changes, but these changes were considered premalignant. Other toxic effects of tobacco on the organism are reviewed and methods of breaking the smoking habit are discussed.

65-571 PULMONARY CANCER AS A PROBLEM OF OUR TIME. (Sp.) Moroder, J. (Dept. Prev. Med., U. Chile Sch. Med., Santiago). Rev. Med. Chile 92(2):154-158, 1964.

In a general discussion on the controversial question of lung cancer and its possible etiologic factors, the author reports that in Chile mortality for cancer of the respiratory system (most involving the lung) has increased from 2/100,000 population in 1931 to 10/100,000 in 1961. The same trend is observed in other countries of the world. Although smoking cannot be considered the direct cause of pulmonary cancer, the association between smoking and lung cancer frequency is proved beyond doubt. A brief review (22 references) of studies leading to the establishment of this association is included.

65-572 STUDY OF THE RELATIONSHIP OF ENVIRONMENTAL FACTORS TO THE TYPE AND FREQUENCY

OF CANCER CAUSING DEATHS IN NUNS, 1963. Nix, J. T. (Nat. Fed. Catholic Phys. Guilds, New Orleans, La.). Hosp. Progr. 45(7):71-74, 1964.

For the yr. 1963 in the U.S., the cause of death was tabulated and verified in 1,116 nuns among a nun population of 116,173 (av. age 45.3 yr.), 99% of whom were Caucasian, largely of Latin, German and Irish extraction. A preliminary report on data from 575/1,116 nun deaths revealed 146/575 deaths (av. age 67.2 yr.) from cancer (7 each stomach, rectum and corpus uteri; 29 colon; 4 each liver or biliary passage and lymphomas; 10 pancreas; 1 each small bowel and cervix uteri; 6 lung; 43 breast; 12 ovary; 3 each bladder and other urinary except kidney; 9 leukemias; 2 glioblastoma). Comparative figures for teachers, nurses and others were: for breast cancer 35, 3 and 5; for colon cancer 26, 7 and 3; for stomach cancer 0, 1 and 2, resp. The preliminary data support the contention that the organ distribution and incidence of cancer in nuns is different from that of their fellow women in America.

65-573 OCCUPATIONAL BLADDER CANCER. (E., Abstract) Scott, T. S. Brit. Med. J. 2:302, 1964.

Of 667 Manchester workmen exposed for more than 6 mo. to the carcinogens 1- and 2-naphthylamine and benzidine, 123 developed bladder tumors. The incidence of bladder cancer in men exposed for 30 yr. or more was 71%, with a latency ranging from 1-40 yr. (av. 18), with absence of symptoms or visible lesions for years. Cytological examination permitted diagnosis at an early stage, but cytodiagnosis was disappointing in the detection of recurrences. About 50% of the men with positive smears had no demonstrable tumor in their urinary tract. (See also CRA 2(8):#1435, 1964.)

65-574 CANCER IN A PRIMITIVE PEOPLE. A CONTINUING STUDY IN AUSTRALIAN NEW GUINEA. (E.) Atkinson, L. (St. Vincent's Hosp., Sydney, N.S.W. Australia), C. Farago, R. B. Forbes and R. E. S. Ten Seldam. Acta Un. Int. Cancr. 20(3):599-601, 1964.

A continuing study of a survey already reported in CRA 1(4):#747, 1963 has revealed that the 4-yr. findings do not yet represent a true epidemiological picture. Comparisons are made with cancer incidence in other racial groups. Mortality and overall mortality surveys have been started. (See also CRA 1(2):#325, 1963.)

65-575 FREQUENCY OF CANCER AND GEOLOGICAL FORMATIONS. (E.) Barany, J. (4, 7 Victor Hugo St., Veszprem, Hungary) and L. Galacz. Acta Un. Int. Cancr. 20(3):609-611, 1964.

In a district in Hungary consisting of 262 localities and 393,300 inhabitants, there were 3,401

cancer pts. on record from 1952-60. It was established that two-thirds of the cancer pts. were found in an area consisting of one third of the district. In this area there are rock formations from the permian age containing small quantities of radioactive minerals. On the hilly places nearby, the frequency of cancer was the least. Radiation measurements were not made.

- 65-576 SPREAD OF MALIGNANT TUMOR IN THE ARMENIAN SOVIET SOCIALIST REPUBLIC. (E.) Bazikian, K. L. (State Oncol. Dispensary, Erevan, Armenian SSR). Acta Un. Int. Cancr. 20(3): 616-619, 1964.

The morbidity for malignant tumors in the Armenian SSR from 1947-59 is reported. Morbidity was highest in the following groups: age 50-59 yr. both sexes; in men (25.4%) between the ages of 60-69 yr.; in women (25.7%) between the ages of 50-59 yr. The most frequent sites were stomach, uterus and skin; the morbidity rate for pulmonary cancer increased more than 14x during the above period. Etiological factors such as harmful customs of the population (use of highly alcoholic drinks ("Nasa") and hot foods), high magnesium content of soil and water and atmospheric pollution are discussed.

- 65-577 HODGKIN'S DISEASE: LONG SURVIVAL IN A STUDY OF 388 WORLD WAR II ARMY CASES. (E.) Cohen, B. M., H. F. Smetana (Natl. Acad. Sci.-Natl. Res. Council, Washington, D. C.) and R. W. Miller. Cancer 17(7):856-865, 1964.

Three hundred eighty-eight cases of Hodgkin's disease among white male soldiers (age 17-59 yr.; av. 26.5) during World War II were histopathologically differentiated into paraganuloma (P; 35), granuloma (G; 308), sarcoma (S; 5) and unspecified type (40), and followed-up for 17 yr. In contrast to Army men in general, pts. with Hodgkin's disease were better educated, were of higher economic class and more were unmarried at time of induction. Pts. with G showed continuing improvement in mortality with passage of time, while pts. with P seemed to undergo an increase in annual mortality after 7 or 8 yr., a pattern suggesting that P transforms to a more malignant histological type. Still alive 17 yr. after diagnosis were 8.4% of the men with G and 28.6% of those with P, a fact suggesting, among other possibilities, that Hodgkin's disease may not be invariably fatal.

- 65-578 COMMENTS ON THE STATISTICAL INVESTIGATION OF LUNG CANCER IN "SMOKING AND HEALTH". (Ger.) Mittmann, O. (U. Bonn Sch. Med., Germany). Med. Welt (35):1832-1835, 1964.

Statistical studies on lung cancer, reported in "Smoking and Health" (the Terry report) are criticized and strong objections are raised against the method used in these studies. The author stresses

the need to study every possible combination of factors (multiple factors calculations). The existence of a direct connection between lung cancer and urbanization, increased number of motor vehicles or cigarette smoking requires further proof. Even if such a connection is found, it still does not mean that such factors are actual causes of lung cancer. Generally it can be assumed with high probability that for specific malignant tumors there are only promoting factors of a cocarcinogenic nature. Thus, the conclusion from the report that a causative relationship exists between cigarette smoking and lung cancer is inadmissible.

- 65-579 RELATIONSHIP BETWEEN LUNG CANCER, CIGARETTE SMOKING, INHALATION AND PERSONALITY. (E.) Kissen, D. M. (Dept. Psych. Med., U. Glasgow, Scotland). Brit. J. Med. Psychol. 37(3):203-216, 1964.

A more detailed account of the data abstracted as CRA 1(3):#535, 1963 and ibid., 2(1):#133, 1964.

- 65-580 PRESENT STATISTICAL DATA ON CANCER IN SPAIN. (Sp.) Carda-Aparici, P. (Nat. Inst. Oncol., Madrid). Rev. Esp. Oncol. 10:113-140, 1964.

Cancer mortality in Spain in relationship to sex, age and tumor site is extensively analyzed and compared to figures from several other countries of the world. Mortality from cancer in Spain represented 10.76% of all deaths in 1956 and 13.74% in 1960; the rate of death from cancer increased from 105 (per 100,000 population) in 1956 to 118 in 1960. Effected figures for 1961 were 14.59% (of total deaths) and a rate of 122. A comparison of the age distribution of cancer mortality in 1941-1944 with 1960 showed that the increase in cancer mortality could not be ascribed only to the increased life-span of the population. In men of age groups 45-49, 50-54, 55-59, 60-64, 65-69 and 70->70 yr. cancer accounted for 5.48, 6.95, 8.15, 8.09, 7.41, and 4.56% of all deaths, resp., in 1941-1944 and 19.70, 22.3, 23, 22.2, 20.4 and 12.4%, resp., in 1960; comparative figures for women were 11.31, 13.16, 12.39, 10.78, 9.05 and 4.36%, resp., in 1941-1944 and 31, 32, 28.5, 23.5, 18.9 and 9.6%, resp., in 1960. In 1960, cancer of the g.i. tract accounted for 48.2% of all cancer deaths (stomach 23%, liver 10.5% and large intestine 8.0%), cancer of the respiratory system for 12.5% (lung 9%, larynx 2.8%), cancer of the genitourinary system for 17.9% (uterus 9.8%, prostate 7.5%), breast cancer, 8.9%, cancer of the hematopoietic system for 4.3% and other types of cancer (skin, nervous system, bones, unspecified) for 17.1%. Frequency of mortality from gastric and respiratory cancer was higher in men (24.7% and 19.6%, resp.) than in women (21.3% and 5.4%, resp.); mortality for hepatic cancer was higher in women (12.6%) than in men (8.4%). A comparison with similar values obtained in 1930-1931 showed

that the death rates for the various sites have remained fairly stable. In men respiratory tumors have increased by 8.4% and genitourinary by 4.5%, while g.i. cancer decreased by 11.5%; in women respiratory cancer has increased by 3.5% at the expense of genital cancer and other sites. Geographic distribution of cancer mortality in the different provinces of Spain is also tabulated.

- 65-581 ORAL CARCINOMA. A CLINICAL STUDY OF 122 CASES. (E.) Sharma, R. N. (Western Railway Hosp., Dohad, India). J. Indian Med. Assn. 43(6):263-268, 1964.

Among 122 cases of carcinoma of the oral tract (from a hospital in Agra and a hospital in Lucknow) commonest sites were 59 cheek (41 male, 18 female) and 45 tongue (41 male, 4 female). Males comprised 80% of the group. As to religion, 86% were Hindus and 14% were Muslims. As to age incidence, 32.8% occurred at age 30-40 yr., 33.7% at age 41-50 yr. Only 6 drank alcohol regularly; 104 used tobacco in some form (35.3% chewed tobacco, sometimes with betel leaves and slaked lime).

- 65-582 SOME RARE TUMOURS OF THE ORBIT. (E., Abstract) Lambert, V. (U. Manchester, England). Proc. Roy. Soc. Med. 57(8):737, 1964.

The rarity of orbital tumors is suggested by the fact that only 100 cases (excluding those arising from the optic nerve or globe) were seen in 1933-63 at the Christie Hosp. and Holt Radium Inst. of Manchester, in comparison to 4,000 cases of cancer of the pharynx and 800 cases of maxillary antrum cancer observed for the same period. One case is reported of an "amyloid" tumor of the frontal bone resembling a carcinoma removed surgically. A 15-year-old girl developed a swelling (thought to be a hematoma) 5 days after being hit by a tennis ball; biopsy, however, revealed an inoperable round cell sarcoma which did not respond to X-ray therapy and the pt. died a few wk. after the injury. A pt. whose primary tumor of the left arm was removed surgically developed a secondary malignant melanoma which invaded the frontal bone and spread into the orbit.

- 65-583 EPIDEMIOLOGICAL AND VITAL STATISTICS REPORT. (Eng. & Fr.) World Health Organization (Geneva, Switzerland). Epidem. Vital Statist. Rep. 17(11):531-642, 1964.

A compilation of global data on mortality during 1960-1962, including data on malignant neoplasms and leukemias for girls and boys, aged 1-4 and 5-9 years, for various countries of the world.

- 65-584 DEATHS FROM SMOKING. (E.) Myddelton, G. C. Brit. Med. J. 2:758, 1964.

In a letter the author points out the startling contrast between lung cancer deaths in London and the rural counties of Ireland (1214 and 195 male death rate/million, resp., in 1960), the low rate of the latter being only one example in favor of the worldwide linkage between lung cancer and urbanization. While the reported correlation between cigarette smoking and lung cancer in the various prospective studies (all dealing with specific groups) does not seem to appear when the statistics of entire countries are compared, urbanization, as indicated very roughly by density of population, is also correlated to the figure for lung cancer deaths; the male lung cancer mortality per million in the U.S. (population density 51/square mile) and the United Kingdom (566/square mile) was 369 and 858, resp. The author emphasizes the need for further research and critical reappraisal of statistics heretofore reported.

- 65-585 MALIGNANT TUMORS IN ALASKAN ESKIMOS: UNIQUE PREDOMINANCE OF CARCINOMA OF THE ESOPHAGUS IN ALASKAN ESKIMO WOMEN. (E.) Hurst, E. E., Jr. (New Eng. Deaconess Hosp., Boston, Mass.). Cancer 17(9):1187-1196, 1964.

During the first 6 yr. of operation of the Alaskan Native Hosp. at Anchorage, 76 cases of malignant tumor were diagnosed with the following distribution: esophagus 9; colon and rectum 8; salivary glands 6; uterine cervix 6; uterine fundus 1; skin 5; thyroid 5; liver 5; breast 4; lung 4; stomach 4; nasopharynx 3; ovary 3; blood-forming organs 3; pancreas 2; kidneys 2; soft tissue 2; gallbladder 2; palate 1; urinary bladder 1. The predominance of carcinoma of the esophagus in Alaskan Eskimo women (7 women, age 40-approx. 70 yr.; 2 men age 57 and 71 yr., resp.) is unique and unexpected. It is suggested that a carcinogen may be present among substances that the women swallow. An addendum points out that many Alaskan Eskimo women are almost constantly occupied in chewing pieces of sealskin, previously scraped using wood ashes as an abrasive; the skins are then used to make footgear.

- 65-586 MALIGNANT TUMORS OF THE LIVER. GENERAL ETIOLOGY; GEOGRAPHIC DISTRIBUTION; NUTRITIONAL FACTORS; PHYSIOPATHOLOGY. (Fr., Abstract) Richir, C., M. Moulanier, C. Quenum, H. Dupin, J. Cros and J. Toury. Sem. Hop. Paris 40(39-40):2117, 1964.

Prof. Payen of Dakar has observed that the geographic distribution of cancer of the liver is very variable; it is 15-100 times more frequent there than in Europe and this same frequency is found in tropical Asia. While Negroes are most frequently affected and mixed breeds are less susceptible in tropical countries, the incidence in American Negroes is not higher than that among American whites. In Africa, liver cancer incidence is highest among young people and in rural communities. As for etiology, the Moslems

drink no alcoholic beverages but high incidences of parasitosis, viral hepatitis and kwashiorkor are noted. The association of liver cancer and cirrhosis has had discordant interpretations. The possible contribution of food fats contaminated by *Aspergillus flavus* is discussed, but the authors have not been able to reproduce this effect experimentally. However, alimentary mycoses exist also in India, where liver cancer is rare.

65-587 SIMULATED AGE PREDISPOSITION TO CARCINOMA: A 10-YEAR THEORY. (Ger.)

Schinz, H. R. (78 Kurhaus St., Zurich, Switzerland) and T. Reich. *Oncologia* (Basel) 18(2): 81-100, 1964.

A statistical study of the number of deaths due to carcinoma (C) in Switzerland from 1950 to 1962 is presented. It was found that the absolute number of deaths due to C increased considerably during this period (>10% in males; >50% in females); however, the mortality due to C for all localities together decreased in all age groups. The C risk, i.e. the probability of dying from C at a certain age, has decreased for all types of C and in all age groups. Recent changes in C risks of the lung and bronchi, stomach, esophagus, prostate, breast and uterus are discussed.

65-588 SOME DATA ON 280 PATIENTS WITH CANCER OF THE PANCREAS. FREQUENCY, PREVIOUS AND

CONCURRENT DISEASES, EXOGENOUS FACTORS. (Ger.) Dörken, H. (1st Clin. Med., U. Hamburg, Germany). *Gastroenterologia* (Basel) 102(1):47-64, 1964.

The world literature on the frequency of pancreatic cancer (PC) and its association with previous and concurrent diseases is reviewed (145 references). Upon the analysis of autopsies over a 33-year period, 280 pts. (180 males (M), av. age 62.5 yr.; 100 females (F), av. age 64.5 yr.) were found with PC, constituting an incidence of 0.3-1.15%. Asymptomatic diabetes (14.4% M, 15% F) may precede PC usually by up to 5 yr., but is highly questionable as a predisposing condition. Neither gallstones (11.1% M, 31% F) nor ulcers (13.3% M, 7% F) are regarded as predisposing factors. No previous diseases of the pancreas were found. Other diseases such as liver cirrhosis, lues, pulmonary tuberculosis, other infections, atherosclerosis and non-bacterial thrombotic endocarditis were rarely noted, whereas venous thrombosis (20% M, 25% F) and lung embolism (16% M, 17% F) were found frequently. Female PC pts. showed a high number of births and 11% had surgically induced menopause. Other primary tumors (maxillary sarcoma, laryngeal and gastric carcinoma, lymphatic leukemia) were found in 4.3% (7 M, 5 F) pts. (See also the following abstract.)

65-589 SOME DATA ON 280 PATIENTS WITH CANCER OF THE PANCREAS. FREQUENCY, PREVIOUS

AND CONCURRENT DISEASES, EXOGENOUS FACTORS. (Ger.) Dörken, H. (1st Clin. Med., U. Hamburg, Germany). *Gastroenterologia* (Basel) 102(2): 65-77, 1964.

In a study of exogenous factors in pancreatic cancer, data were obtained on the habits and occupations of 150/280 pts. with pancreatic cancer. Among 100 males (M) only 2 were non-smokers, the remaining were usually heavy smokers; 30% were cigar smokers, 23% mixed (cigarette + cigar) smokers, 3% tobacco chewers. Seven were cigar makers by occupation. Of 50 females (F) only 10 were smokers. Little or no alcohol consumption was found in 13/100 M; in 30/100 M, regular to excessive alcohol consumption was reported (10/30 were habitual drinkers; 8/30 were bartenders or employed in the alcohol industry). Many were in metal industries (35/100 M). (See also the preceding abstract.)

65-590 AGE AND SEX DISTRIBUTION OF PATIENTS WITH VARIOUS LOCALIZATIONS OF CANCER.

(Rum.) Negru, I. (Inst. Oncol., Bucarest, Rumania), J. Negru and C. Stefanescu. *Oncol. si Radiol.* 2(5):459-464, 1963.

An analysis of 20,024 cancer cases encountered at the Oncologic Inst. in Bucharest between 1951-60 is given (for details of distribution of the first 15,000 cases see CRA 1(9-10):#1767, 1964). On a percentage basis, complete data indicate that the distribution per age group according to localization and sex differs from that seen for cancer in general. Systemic malignancies and tumors of the bone and muscles are relatively frequent in young age groups, i.e. up to 30% of all cases were found in groups under 25 yr. of age. (See also the following abstract.)

65-591 TERRITORIAL VARIATIONS OF THE MORTALITY FROM MALIGNANT TUMORS IN THE RUMANIAN

DEMOCRATIC REPUBLIC. (E.) Georgescu, D. C. (Oncol. Inst. Bucharest, Rumania), P. Muresan, I. Negru and J. Negru. *Acta Un. Int. Cancr.* 20(3):652-655, 1964.

The cancer mortality rate in Rumania between 1931 and 1960 has been investigated and was found to increase steadily from 38.8 to 108.9/100,000 (+181%), being most marked in recent yr. (1956-1960). Incidence among rural populations is approaching that among the urban, while areas showing a consistently high occurrence are the trans-Carpathian region, and the western and central parts of the country. A partial explanation might be found through studies of the structure of population age-groups, geophysical and climatic environment, or the biologic, social and ethnographic conditions (including food peculiarities) of the various regions. The major types determining regional differences in mortality rate were cancers of the stomach, uterus or bronchus and lung. (See also CRA 1(9-10):#1767, 1964 and the preceding abstract.)

- 65-592 SMOKING HABITS AND HEALTH IN IOWA AND NEIGHBORING STATES. (E.) Hammond, E. C. (Statist. Res. Sec., Amer. Cancer Soc., New York, N. Y.), and A. Stocks. J. Iowa Med. Med. Soc. 54(10):563-567, 1964.

In an epidemiological study in which cigarette smoking is indicated as a serious hazard to health, it is reported that of 204 men who died of lung cancer at the age of 40-89 yr., 9/204 had smoked cigars or pipes, while 188/204 had smoked cigarettes regularly. The lung cancer death rate of cigarette smokers increased markedly with the amount of smoking, and was 10x higher in cigarette smokers than in nonsmokers. Of 86 pts. who died of cancer of the buccal cavity, pharynx, larynx, esophagus or bladder, 17/86 had smoked pipes or cigars, 22/86 cigarettes and pipes or cigars, and 38/86 cigarettes only. (See also CRA 2(2):#181; ibid.; and ibid., (7):#1369 and #1370, 1964.)

- 65-593 PATHOLOGY OF THE MUCOSA OF THE RESPIRATORY TRACT IN WORKERS OF FOUNDRIES, GLASS AND METALLURGIC INDUSTRY WITH RESPECT TO THE OCCURRENCE OF THE CARCINOGEN, 3,4-BENZOPYRENE, IN THE WORKING ATMOSPHERE. (Cz.) Kolomaznik, L. (Dept. Otolaryng., Uherske Hradiste Hosp., Czech.). Cesk. Otolaryng. 13(4):233-238, 1964.

Among 286 foundry workers, 125 glass factory workers, and 563 control subjects (farmers), 58%, 47%, and 16%, resp., were smokers and were occupationally exposed for 9, 11.5, and 50 yr., resp., to atmospheres containing 1.2 $\mu\text{g}/\text{m}^3$, 0.78-2.92 $\mu\text{g}/\text{m}^3$, and 0, resp., of 3,4-benzopyrene. The changes found in the respiratory tract included neoplasms of the nasal cavity (0, 0, 0.2%); neoplasms of the uvula and pharynx (0.3%, 4.8%, 0.3%); leukoplakia (1.7%, 4.0%, 0); pachydermia of the larynx (2.7%, 1.6%, 0.2%); neoplasms of the larynx (3.1%, 2.4%, 0.7%); laryngeal carcinoma (0, 0.8%, 0); pulmonary carcinoma (0.3%, 0, 0). (See also CRA 1(3):#550, 1963.)

- 65-594 OCCURRENCE OF 3,4-BENZOPYRENE IN GLASSWORKS AND FOUNDRIES. (Cz.) Zdražil, J. (OHES, Gottwaldov, Czech.) and F. Picha. Cesk. Otolaryng. 13(4):239-241, 1964.

The conc. of 3,4-benzopyrene found under various working conditions is specified (air; 0.046-4.85 $\mu\text{g}/\text{m}^3$; sediments: up to 16 mg/kg) and suggestions for minimizing the danger of carcinogens in industry are presented. (See also the preceding abstract.)

- 65-595 ORAL CANCER IN NEW GUINEA. A STUDY IN DEMOGRAPHY AND ETIOLOGY. (E.) Atkinson, L. (Dept. Radiother., St. Vincent's Hosp., Sydney, N.S.W., Australia), I. C. Chester, F. G. Smyth and R. E. J. Ten Seldam. Cancer 17(10):1289-1298, 1964.

A total of 209 cases of oral cancer was reported between 1958 and 1963 in the Territory of Papua and New Guinea. These cases comprised 23.0% and 10.8% of all types of cancer occurring in males and females, resp. However, these figures, although indicative, do not give the true incidence. The disease in this group appears to be less malignant than that found in Caucasians. The highest frequency is noted in age group 45-50. A close etiological relationship between betel nut chewing and this type of cancer is suggested; the lesions, particularly those on the buccal mucosa, were associated with long-standing leukoplakia. Among highland people who only rarely chew betel nut, the incidence rate was 4.8% and 5.4% for males and females, resp. The indicated carcinogenicity of the betel nut mixture might be due to the addition of a preparation consisting of slaked lime, calcium oxide and traces of calcium carbonate.

- 65-596 CANCER OF ESOPHAGUS IN PUERTO RICO. MORTALITY AND INCIDENCE ANALYSIS -- 1950-1961. (E.) Martinez, I. (Div. Cancer Control., Puerto Rico Dept. Health, Santurce). Cancer 17(10):1279-1288, 1964.

During the 12 yr. (1950-61) included in this study, esophageal cancer (1,944 cases) accounted for 11% of all deaths from cancer in Puerto Rico. The age-adjusted death rates (per 100,000 population) increased during this period from 7.9 to 15.6 in males and from 4.1 to 5.7 in females. The over-all male to female mortality ratio was 2.3:1. Mortality increased steadily from age 40 to 75 yr. or older. The highest age-adjusted incidence rate occurred in the West District (Aguadilla) and the lowest in the East District (Fajardo). From the reports obtained, 64% were confirmed histologically, of which 88% were epidermoid carcinoma. A total of 75% of the cases were confirmed by various objective methods, and 25% were diagnosed clinically or reported by death certificate. Of 25 countries, Puerto Rico has had the highest mortality rate from this disease since 1956. The greatest frequency was noted among the lower socioeconomic classes. Late diagnosis is suggested as one of the causes for these results. An analytical study of associated etiological factors, and methods for control are being planned. (See also CRA 1(9-10):#1786 and #1787, 1964)

- 65-597 STATISTICAL SURVEY OF CARCINOMA FREQUENCY AFTER STOMACH SURGERY FOR ULCER. (Ger.) Griesser, G. (Clin. Surg., U. Tübingen, Germany) and H. Schmidt. Med. Welt (35):1836-1840, 1964.

In 2 groups of pts. who underwent surgery for gastric ulcer (580 and 354 evaluable pts.), gastric carcinoma occurred in 13.3% and 14.1%, resp., whereas in a group treated conservatively (320 evaluable pts.), the incidence of gastric

carcinoma was only 8.4%. In a group of surgically treated duodenal ulcers (224 evaluable pts.), only 6.25% developed gastric carcinoma. The average interval between surgery for ulcer and manifestation of cancer was 21 yr. With the various surgical methods, the incidence of carcinoma was higher (15-16%) after gastrojejunostomy with or without gastric resection than after Billroth I gastric resection (7%); this increase after gastrojejunostomy occurred only in cases of gastric ulcer, but not in those of duodenal ulcer.

65-598 SMOKING HABITS AND DISEASE IN PENNSYLVANIA. (E.) Hammond, E. C. (Statist. Res. Sec., Amer. Cancer Soc., New York, N. Y.), J. J. Halloran and E. C. Nicodemus. Penn. Med. J. 67(10):19-23, 1964.

The findings of this first follow-up (34.5 mo.) in Pennsylvania agree with those of the larger group of the 1959 prospective epidemiologic study of smoking habits, morbidity, and mortality rates as reported in CRA 2(7):#1368, 1964. This report covers 40,432 males aged 40-89 traced through 1962. Death rate from cancer of the lung was approx. 6 times as high among smokers of 40 or more cigarettes daily as among those who smoked 1-9 cigarettes daily. Of 74 lung cancer deaths in men between the ages of 40-89 yr., only 1 was a nonsmoker; the lung cancer rate was higher in those who began to smoke at an early age. Of 25 who died of cancer of the buccal cavity, pharynx, larynx, esophagus, and bladder, only 1 was a nonsmoker.

65-599 CANCER EPIDEMIOLOGY IN THE PACIFIC AREAS. (E.) Quisenberry, W. B. (Hawaii State Dept. Health, Honolulu). Acta Un. Int. Cancr. 20(3):763-767, 1964.

In an investigation of ethnic groups residing in Hawaii (Hawaiians, part-Hawaiians, Chinese, Japanese, Filipinos and Caucasians) the incidence of stomach cancer was highest in the Japanese (approx. 2-2.5 times higher than in Caucasians). This might be due to dietary factors such as low vitamin B₁ intake, low protein consumption, and ingestion of hot food and beverages. The highest incidence of primary cancer of the liver was

found in Filipinos and Chinese and might be related to diet and possibly to parasitic infestation. Caucasians exhibited the highest rate of lung cancer, which may be correlated with more cigarette smoking and residence in areas with higher atmospheric pollution than Orientals. Breast cancer was also noted to be higher in Caucasian women than in Oriental women; the mode of nursing children might be a factor. Mating customs are suggested as a possible cause for the much greater incidence of prostatic cancer among Caucasians than Orientals. Nasopharyngeal cancer was most prevalent among Chinese and might be due to their practice of inhaling incense. The incidence rates for skin cancer are reported in CRA 1(2):#324, 1963.

65-600 SALIVARY-GLAND TUMORS IN UGANDA. (E.) Davies, J. N. P. (Dept. Path., Albany Med. Coll. Union U., N. Y.), O. G. Dodge and D. P. Burkitt. Cancer 17(10):1310-1322, 1964.

Analysis of 129 salivary gland tumors in Ugandans revealed a significantly higher proportion occurring in the submandibular gland and palate than in other series reported in the literature. The incidence of salivary gland tumors in Uganda (0.3/100,000/yr. in men and 1.1/100,000/yr. in women) was no higher than in non-African countries. A high frequency of malignant tumors of the parotid and palatal areas occurred at an earlier age in this group than in other series. A relatively high frequency of true carcinomas was also noted. Most submandibular tumors were benign. Malnutrition does not appear to be an etiological factor in the occurrence of salivary gland tumors.

65-601 THE EPIDEMIOLOGY OF CANCER IN AFRICA. (E.) Murray, J. F. (South African Inst. Med. Res., Johannesburg). Acta Un. Int. Cancr. 20(3):753-757, 1964.

The application of epidemiological methods in the study of possible environmental causative factors for such neoplasms as malignant hepatoma, carcinoma of the paranasal sinuses, multicentric sarcoma of the jaw, esophageal carcinoma and mesothelioma as they occur in various races and regions of Africa are discussed.

See also abstract nos.: 412,419,431,445,447,477,490,504,604

MISCELLANEOUS

- 65-602 MULTIPLE HEREDITARY OSTEOCHONDROMATOSIS WITH LATE MALIGNANT TRANSFORMATION. (A CASE REPORT.) (E.) Chang, G. H. (Dept. Orthoped., Chonnam U. Sch. Med., Kwangju, Korea). Chonghap Suihak (Korea. Med. J.) 7(12):51-55, 1962.

The case is presented of multiple hereditary osteochondromatosis with late malignant change occurring after more than 40 yr. and involving the left pelvic girdle in a 72-year-old man with a history of successively occurring bony hard protrusions at various parts of the body from 5 until about 25 yr. of age. The tumors were quiescent for about 40 yr. until 3 yr. before this report when the pelvic mass began to increase in size. The male persons of the previous 3 generations had had similar bony protrusions and death seemed attributable to the malignant change in some of them. The peculiar character of the secondary chondrosarcoma is discussed together with a review (9 references) of the literature.

- 65-603 RELATION BETWEEN EXPERIMENTAL HEPATOCARCINOGENESIS AND CIRRHOSIS. (E.) Kinoshita, R. (Dept. Exp. Path., City of Hope Med. Ctr., Duarte, Cal.) and H. Miyaji. Acta Un. Int. Cancr. 20(3):567-568, 1964.

The authors review experimental data supporting the view that hepatocarcinogenesis is not essentially the consequence of cirrhosis. Although hepatoma and cirrhosis can occur together, each may be induced independently by the same agent. Toluylenediamine and furfural, cirrhosis-inducing compounds, were found to be non-hepatocarcinogenic. The problem lies in the fact that the liver cell continues to undergo regenerative proliferation despite increasingly varied experimental conditions and whether or not cirrhotic changes are present.

- 65-604 HOW SEX INFLUENCES HEPATOCARCINOGENESIS? (E.) Oota, K. (Dept. Path., Tokyo Med. Dent. Coll., Japan). Acta Un. Int. Cancr. 20(3):575-576, 1964.

Collected autopsy data in Japan (1959) revealed 140 primary hepatic cancers in males and 44 in females, a frequency ratio of roughly 2:1 (based on corrected sex distribution of overall autopsies). The rate of hepatic cancer associated with cirrhosis was higher among males. In the rat, induced hepatoma apparently develops earlier in the male, whereas the overall incidence is equal in both sexes (if follow-up is long enough). It appears that the influence of sex lies in the induction of the precancerous conditions and in the promotion of established hepatoma. There may be no influence on the mechanism of cancer induction.

- 65-605 SOME GENERAL PRINCIPLES OF NEOPLASTIC DEVELOPMENT. (E.) Foulds, L. (Chester Beatty Res. Inst., London, S.W.3). Acta Un. Int. Cancr. 20(3):663-666, 1964.

A generalized scheme of neoplastic development is presented. Precancerous lesions are significant in that they are potential sites of progression to carcinoma and they provide evidence that prior carcinogenic action has established a region of incipient neoplasia in some other part from which a carcinoma may develop later, either directly or indirectly. In neoplasia of the human uterine cervix and bladder, the incipient neoplasia is often more extensive than visible lesions indicate; this seems to be true also of cancer of the lung and breast. In skin carcinogenesis, both direct and indirect paths of development are well known.

- 65-606 PRETUMOROUS CHANGES IN THE CENTRAL NERVOUS SYSTEM. (E.) Avtsyn, A. P. (Inst. Morphol., Leningrad, USSR). Acta Un. Int. Cancr. 20(3):691-692, 1964.

In a review and discussion of pretumorous changes in the human brain, the author noted that an analysis of histological material from the Burdenko Neurosurgical Inst. showed that the majority of brain tumors occur without preceding developmental abnormalities or severe injuries. Other mechanisms such as metabolic disturbances in the CNS or hormonal imbalance seem, however, to be associated with precancerous changes. The proliferation of astrocytic glia in the paraventricular zones of the brain in the aged is discussed as a possible precancerous process. For the experimental induction of cerebral tumors in animals see CRA 1(1):#87, 1963. (See also CRA 2(4):#603, 1964.)

- 65-607 THE BIOLOGICAL CHARACTERISTICS OF COLONIC AND RECTAL NEOPLASMS WITH REFUTATION OF THE CONCEPT THAT ADENOMATOUS POLYPS ARE HIGHLY PRE-MALIGNANT TUMORS. (E.) Ackerman, L. V. (Washington U. Sch. Med., St. Louis, Mo.), H. J. Spjut and J. S. Spratt, Jr. Acta Un. Int. Cancr. 20(3):716-723, 1964.

Data are presented to support the concept that adenomatous polyps are not highly premalignant lesions and that most colonic and rectal cancers begin from the colonic mucosa without passage through a series of histological changes. The ratio of the number of adenomatous polyps to the number of cancers found in the population (an index of the likelihood of polyps becoming adenocarcinomas) was: age 20-39, 1:538; age 40-59, 1:162; age 60-79, 1:96; age 80+, 1:40.

- 65-608 THE SIGNIFICANCE OF "SQUAMOUS METAPLASIA" AS A PRECANCEROUS LESION FOR

SQUAMOUS CELL CARCINOMA IN BILHARZIAL BLADDERS. (E.) El Gazayerli, M. (Dept. Path., Alexandria U., Egypt). *Acta Un. Int. Cancr.* 20(3): 741-742, 1964.

In a discussion on whether squamous change is precancerous, the author noted that the presence of a squamous change in other chronic inflammatory conditions, such as tuberculous cystitis in bilharzial and non-bilharzial countries, and the failure to demonstrate an increase in the mitochondria in the squamous epithelium of bilharzial bladders indicates that the change is not precancerous but a common association with chronic inflammatory lesions of the urinary bladder. (See also CRA 2(3):#553, 1964.)

65-609 NEOPLASTIC DISEASES IN TWINS: EVIDENCE FOR PRE- OR PERINATAL FACTORS CONDITIONING CANCER SUSCEPTIBILITY. (E.) Osborne, R. H. (U. Wisconsin, Madison) and F. V. De George. *Cancer* 17(9):1149-1154, 1964.

The conventional concordance-discordance method was applied to studies on 152 white twinborn pts. (219 were used for certain aspects of the study) admitted to N. Y. Memorial Hospital for Cancer and Allied Diseases from April 12, 1959 to December 31, 1962. It is concluded that the cancer experience of twins does differ from that of the single born; selection of twin pairs for survival of the 2 members will bias a twin sample; undue environmental stresses in the pre- and perinatal period may have an effect upon the likelihood of developing cancer (a promising area for investigating cancer causes). There is adequate reason to question seriously the general application of genetic conclusions based on conventional concordance-discordance type of cancer studies in twins to the single born.

65-610 ELEVATION OF LIVER NEURAMINIDASE ACTIVITY IN THE TUMOR-BEARING HOST. A BIOCHEMICAL APPROACH TO THE MECHANISM OF CANCER INVASION AND METASTASIS FORMATION. (E.) Baba, T. (Lab. Exp. Path., Nat. Cancer Ctr. Res. Inst., Tokyo), M. Ishii and K. Aoki. *Gann* 55(4):331-339, 1964.

Marked elevation of neuraminidase activity (assayed by a new method for determining sialic acid based on column-chromatographic separation and thiobarbituric acid reaction) was found in the livers of Ehrlich carcinoma-bearing ddN mice (both sexes; wt. approx. 20 g) and ascites hepatoma (AH-130)-bearing Donryu rats (both sexes; wt. approx. 120 g). Neuraminidase activity was markedly elevated in the liver, but only slightly elevated in the brain and kidney, of tumor-bearing hosts. Test materials were taken 7 or 8 days after transplantation in the case of ascites form of either tumor, and 20 or 21 days after the s.c. transplantation of solid tumors. It is suggested

that a study of the relation between mucosubstances and cancer invasion or metastasis might be fruitful.

65-611 THE RELATIONSHIP OF ALOPECIA MUCINOSA TO MALIGNANT LYMPHOMA. (E.) Pinkus, H. (Dept. Derm., Wayne State U. Coll. Med., Detroit, Mich.). *Dermatologica (Basel)* 129(3):266-270, 1964.

The histology and histogenesis of alopecia mucinosa and the differential diagnosis from eczematous and pyodermatous diseases are discussed. Two case histories are presented in detail of a 50-year-old woman and a 75-year-old man who had an initial diagnosis of alopecia mucinosa which took the fatal course of malignant lymphosarcoma and mycosis fungoides, resp. Two other pts. had similar courses; 1 has died of mycosis fungoides and the other is still alive with the same disease. An unproven hypothesis of virus etiology is proposed which states that in young people an immunity is more likely to develop than in older people where continued stimulation of the RES of the skin gradually leads to lymphoma.

65-612 CHROMOSOMAL STUDIES IN ACUTE AND CHRONIC MYELOID LEUKEMIA. (Ger.) Hampel, K. E. (Dept. Hemat., 1st Clin. Med., Free U. Berlin) and G. Palme. *Neoplasma (Bratisl.)* 11(2):113-122, 1964.

In addition to the case reported in CRA 3(1): #178, 1965, another case of chronic myeloid leukemia (treated by myleran and 6-MP) in a woman is presented. Numerical aberrations, endoreduplication in about 11% of the metaphases and structural chromosomal abnormalities were noted. Chromatid and chromosome breaks were observed in 48% of the metaphases. The Ph¹ chromosome was found in some 16% of the cells. A new radiation-induced complex chromosome abnormality with a star pattern is described. DNA synthesis rate of the Ph¹ chromosome appears to be reduced as compared with that of group 21 chromosomes.

65-613 A CASE OF SARCOMA WITHIN AN ULCERATION OF AN EXTENSIVE SCAR OF THE FOOT. (Pol.) Bielawski, J. (3rd Clin. Surg., Acad. Med., Wrocław, Poland) and M. Bernat. *Chir. Narzad. Ruchu Ortop. Pol.* 29(4):551-553, 1964.

A 19-year-old man developed gas gangrene and infection of the fibula following a gunshot wound of the tibia and underwent multiple surgical procedures within the next 20 yr. At the age of 38, he presented with a large ulceration of the sole and histological picture of a fibrosarcoma or neurofibrosarcoma, and underwent amputation. It was concluded that the multiple surgical procedures in the scarified areas with poor circulation, as well as the inflammatory processes, may have contributed to the malignant degeneration. (5 references)

- 65-614 SIMULTANEOUS APPEARANCE OF MENINGIOMA AND GLIOBLASTOMA. (Ger.) Bingas, B. (Max-Planck Inst. Brain Res., Cologne, Germany) and C. V. Brunngraber. Zbl. Neurochir. 24(6): 271-275, 1964.

In a 63-year-old woman, who underwent surgery for uterine myoma 5 yr. previously, a glioblastoma and a meningioma (the latter first discovered at surgery) were removed from the same bone flap.

- 65-615 SURVIVAL TIME OF LACTIC DEHYDROGENASE AGENT FROM MOUSE TUMORS DURING PROLONGED INCUBATION IN FIBROBLAST CULTURES. (Ger.) Georgii, A. (Inst. Path., U. Munich, Germany) and D. Brdiczka. Zschr. Krebsforsch. 66(3):207-212, 1964.

Lactic dehydrogenase agent (LDH-A) from mouse sarcoma I was incub. for 20 min. at 37°C with medium-free cell cultures before addition of medium. Demonstration of LDH-A was made in mice by a single i.p. inj. of 0.5 ml or more of the medium (samples taken at interval of 24 hr.) from culture flasks. LDH-A infectivity lasted 8 days in normal mouse embryo cultures and 16 days in mouse embryo cultures following *in vivo* infection (through the placenta) as compared to a max. of 4 days in Hank's salt soln. and cell-free culture. No enzymatic changes were found in mouse sera when tested with normal mouse embryo cultures. LDH-A level in mouse sera increased after inoc. of 16-day-old media from *in vivo* infected cultures. An additional *in vitro* infection had no effect on the survival time of agent or the degree of enzymatic changes in animals. (See also CRA 1(2):#255, 1963; *ibid.*, 2(3):#521; and *ibid.*, (7):#1243 and #1312, 1964.)

- 65-616 CANCER INCIDENCE AND MORTALITY IN PATIENTS HAVING ANTICOAGULANT THERAPY. (E.) Michaels, L. (Manitoba Clin. Winnipeg, Canada). Lancet 2:832-835, 1964.

A total of 22 cancers (cutaneous, pulmonary, prostatic, mammary, gastric and renal) developed in 19 out of the 540 pts. treated with anticoagulants for thromboembolic disease and observed for 1569 patient-years. Only 1 death from cancer occurred in contrast to 8 predicted (on the basis of known cancer behavior in the general population). Only 2 organs were involved by metastases. No death was attributable to metastases. These findings suggest that anticoagulant therapy may alter the natural history of cancer.

- 65-617 DISAPPEARANCE OF THE Gm(a) FACTOR FROM THE SERUM OF PATIENTS WITH ACUTE MYELOBLASTIC LEUKEMIA. (Fr.) Ruffié, J. (Blood-Type Ctr., Nat. Sci. Res. Ctr., Toulouse, France), J. Ducos, M. Varsi and P. Colombies. C. R. Acad. Sci. (Paris) 258(18)(Group 12):4615-4617, 1964.

Tests of anti-Gm(a) antibody inhibition in 5 leukemic pts. with Gm(a+b+x-) serum showed that, during the course of their illness, the serologic Gm(a) factor diminished progressively and finally disappeared. In one pt. transfused with whole blood it reappeared only to disappear again later. This did not occur in another pt., transfused with washed cells only (without plasma). No modifications were noted for factor Gm(b). The serologic anomaly may correspond with the metabolic alteration of certain hematopoietic cells, which in turn may be linked with the chromosomal changes which characterize some clones of leukemic cells.

- 65-618 CYTOGENETIC STUDY OF TWO CANCEROUS TUMORS. (Fr.) Ruffié, J. (Blood-Type Ctr., Nat. Sci. Res. Ctr., Toulouse, France), P. Marquès and A.-M. Mourlan. C. R. Acad. Sci. (Paris) 258(6)(Group. 14):1935-1937, 1964.

Cell cultures were studied of malignant effusions from a 51-year-old pt. with mammary adenocarcinoma (treated by irradiation and endoxan) and a 72-year-old pt. with sigmoid or ovarian adenocarcinoma (treated with cobalt therapy). Normal diploid chromosome numbers were found in 19/30 and 20/27 cells, resp.; 6/30 and 2/27 were hypodiploid, 0/30 and 2/27 hyperdiploid, 3/30 and 2/27 hypotetraploid, and 2/30 and 1/27 tetraploid. Structural abnormalities included the presence of large dicentric and/or acentric chromosomes and of dicentric, suggesting a clonal origin. These abnormalities may be due to either to the cancer or to the therapy.

- 65-619 SARCOMAS DUE TO CHRONIC INFLAMMATION. (Ger.) Pitzler, K. (Clin. Surg., U. Jena, Germany). Arch. Geschwulstforsch. 23(3): 204-219, 1964.

A male pt., who at the age of 29 yr. had an injury of the upper arm, developed about 16 yr. later an osteochondromyxosarcoma of the proximal humeral metaphysis. In a 20-year-old man, femoral injury resulted approx. 26 yr. later in a malignant hemangioendothelioma. In a 74-year-old woman, a cutaneous fibrosarcoma of the upper abdomen developed 4 yr. after injury. Although local recurrence was not present, 4 yr. after surgery an axillary tumor was noted. In the first 2 pts., the sarcoma was due to chronic osteomyelitis, while in the third pt. it was due to chronic inflammation of soft tissue. A review (68 references) of cases from the literature is also included.

- 65-620 IMMUNOLOGICAL STUDIES IN PATIENTS WITH PLACENTAL CHORIOCARCINOMA. (E.) Mathé, G. (Dept. Hemat., Gustave-Roussy Inst., Villejuif/Seine, France), J. Dausset, E. Hervet, J. L. Amiel, J. Colombani and G. Brule. J. Nat. Cancer Inst. 33(2):193-208, 1964.

The sera of 5 women with metastatic choriocarcinoma contained agglutinins against the spouse's leukocytes and thrombocytes, the leuko-agglutinating power (LAP) of which was poor in 2/5 and marked in 3/5. Tolerance to skin graft from the resp. spouses was at the upper limit of normal in pts. with high LAP and above normal in pts. with low LAP.

65-621 CHROMOSOMAL STUDIES IN BOVINE LYMPHOSARCOMA. (E.) Hare, W. C. D. (Dept. Anim. Biol., U. Pennsylvania Sch. Vet. Med., Philadelphia), R. A. McFeely, D.A. Abt and J. R. Feerman. J. Nat. Cancer Inst. 33(1):105-118, 1964.

Chromosomal studies were made on cells obtained from short-term, peripheral blood leukocyte cultures and/or directly from lymph nodes of 9 cattle (5 Holstein and 1 each of Aryshire, Guernsey, Jersey-Shorthorn and Jersey; age 1.5-8.5 yr.) with bovine lymphosarcoma. Alterations in chromosomal numbers were observed, but no pattern of aneuploidy or structural change was found. Four cases showed abnormal karyotypes without 1 of the submetacentric or sex chromosomes; 2 had cells with the same marker chromosomes in more than 1 lymph node; 4 cases showed lymph node cells with abnormal karyotypes but peripheral blood cultures with apparently normal karyotypes.

65-622 ACCEPTANCE OF ALLOGENEIC TUMOR AND SKIN GRAFTS IN BACKCROSS PROGENY OF A HOMO-GRAFT-TOLERANT MALE. (E.) Guttmann, R. D. (U.S. Naval Sch. Med., Bethesda, Md.), G. J. Vosika and J. B. Aust. J. Nat. Cancer Inst. 33(1):1-5, 1964.

Breeding of C3H (tolerant A) male with (AxC3H)F₁ female mice produced a backcross population which almost uniformly accepted a spontaneous (AxC3H)F₁ hybrid mammary adenocarcinoma. These progeny also accepted an eighteenth-generation transplant of strain A mammary adenocarcinoma in a higher incidence than expected. This alteration of normal histocompatibility suggests a change induced by the presence of strain A cells during the maturation of C3H germ plasma. The progeny, at a later date, also accepted a significant number of (AxC3H)F₁ hybrid skin grafts and allogeneic strain A skin grafts.

65-623 POLYPS OF THE COLON AND RECTUM. A REVIEW OF 12 YEARS' EXPERIENCE AND REPORT OF AN UNUSUAL CASE. (E.) Bigelow, B. (Dept. Path., New York U. Med. Ctr., N. Y.) and J. Winkelman. Cancer 17(9):1177-1186, 1964.

The case is presented of a 47-year-old man with a metastasizing carcinoma originating in an adenomatous polyp of the rectum. In a review of 12 yr. experience (1950-62), a total of 791 benign or partially malignant lesions divided among adenomatous polyps (AP) and villous adenomas (VA)

were examined. Malignant AP amounted to <1% as compared to 4% for malignant VA; only 7/698 (1.0%) AP contained areas of microscopic malignancy in contrast to 31/92 (33.7%) VA; invasive carcinoma was present in only 1/7 AP. A literature review (10 references) of the controversy concerning the malignant potential of AP and the metastasizing potential of the malignant ones is included.

65-624 A STUDY OF THE KARYOTYPE OF A MONO-LAYER CULTURE OF CARCINOMA OF THE HUMAN STOMACH. (E.) Ugryumov, E. P. (Inst. Exp. Biol., Acad. Med. Sci. USSR, Moscow) and M. T. Tsoneva-Maneva. Biull. Eksp. Biol. Med. (Eng.) 55(5): 560-564, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 55(5):93-96, 1963. Karyotype studies of the Cave strain of human gastric carcinoma cells showed the chromosome number in 81% of the cells to vary from 58 to 62 with a peak within the range of 58-60. The majority of the cells possessed a long, subtelocentric marker chromosome; some cells showed an additional large and acrocentric marker chromosome. Small chromosome fragments were observed in some cells. The presence of mono- and trisomy in individual chromosomes is assumed.

65-625 PAGET'S DISEASE OF THE VULVA ASSOCIATED WITH AN UNUSUAL BLADDER TUMOUR. (E.) Kay, J. M. (Dept. Path., U. Birmingham, England) and W. F. W. Southwood. Brit. J. Cancer 18(2): 233-237, 1964.

The case is reported of a 43-year-old deaf mute woman with Paget's disease of the vulva subsequently associated with a poorly differentiated tumor of the urinary bladder composed of a mass of pleomorphic cells. Metastases were found in the lymph nodes, vertebral column and liver. It is suggested that a carcinogenic agent carried in the ducts of the apocrine sweat glands may induce changes in the skin and duct epithelium with eventual progression to an invasive carcinoma.

65-626 FAMILIAL PHEOCHROMOCYTOMA PRESENTING AS FAMILIAL DYSAUTONOMIA. A CASE REPORT. (E.) Smith, A. A. (New York U. Sch. Med., N. Y.) and J. Dancis. J. Pediat. 65(3): 463-465, 1964.

The case histories are presented of an 18-year-old girl and her 12-year-old brother with familial pheochromocytoma presenting as atypical familial dysautonomia. The superficial similarities of the two diseases are stressed and the application of the intradermal histamine test in diagnosis is discussed.

- 65-627 KARYOTYPE AND SEX OF PRIMARY TESTICULAR TERATOMAS IN MICE. (E.) Stevens, L. C. (Jackson Lab., Bar Harbor, Maine) and M. C. Bunker. J. Nat. Cancer Inst. 33(1):65-78, 1964.

When the karyotypes of 491 cells from 29 spontaneous primary testicular teratomas from 29 spontaneous primary testicular teratomas of 7-10-day-old strain 129 mice were compared to those of normal testicular and embryonic cells, the chromosome number and morphology of the early teratoma cells were indistinguishable from the cells in normal testis and embryos. This indicates that gross chromosomal changes are not involved in teratocarcinogenesis in strain 129 mice. Among 89 cells of primary teratomas, 87 had 3 chromosomes (the smallest autosomal pair and the Y) smaller than any other chromosome, which indicates that these cells were male. The simplest explanation in accord with the evidence presented here is that teratomas arise directly from diploid rather than haploid cells, probably primordial germ cells. (See also CRA 3(2):#612, 1965.)

- 65-628 CONTROL OF CELL BEHAVIOR: TOPOLOGICAL FACTORS. (E.) Curtis, A. S. G. (Dept. Zool., U. London) and M. Varde. J. Nat. Cancer Inst. 33(1):15-26, 1964.

Cell behavior was studied in chick heart fibroblasts from 9-day embryos grown in a medium containing serum, embryo extract and saline. Four types of outgrowth were seen: cell sheets on glass, cell sheets suspended in the medium between fibers, cells growing on fibers and cells growing on ridged and furrowed substrates. Highly convex surfaces enhanced cell overlap; grooves diminished cell overlap. Results are discussed (16 references) with reference to the mechanism of contact inhibition and the local invasion of tumor cells.

- 65-629 ELECTROPHORETIC SPEEDS OF CELLS DERIVED FROM THE MOUSE LUNG AND WHICH HAVE ACQUIRED VARIOUS DEGREES OF MALIGNANCY IN VITRO. (Fr.) Barski, G. (Lab. Tissue Cult., Gustave-Roussy Inst., Villejuif, Seine, France) and N. Choucroun. C. R. Acad. Sci. (Paris) 258(8) (Group. 14):2442-2445, 1964.

Electrophoretic studies by phase microscopy were conducted on cells of lines P2 and PTT 12, previously described in CRA 1(5):#1012, 1963, and taken from 8-10-day-old monolayers. Mobility, expressed in seconds needed to traverse a standard distance, of cells suspended by trypsinization was 5.3-5.8 for P2 and 4.2-4.3 for PTT12; 3 wk. later, mobility times for similarly dispersed cells were 5.3 and 3.6, resp.; for those mechanically dispersed, mobilities were 5.0 and 4.2, resp. PTT12 cells, being the more rapid, were, therefore, the most highly charged. It is concluded that a relationship exists between the malignancy of cells and the density of their surface electrical charge.

- 65-630 GASTRIC MELANOMA METASTASES DUE TO MALIGNANT DEGENERATION OF XERODERMA PIGMENTOSUM. (Ger.) Šári, A. (Oncol. Res. Inst., Bratislava, Czech.), J. Liška and J. Judin. Neoplasma (Bratisl.) 10(6):641-650, 1964.

A case report.

- 65-631 FAMILIAL HODGKIN'S DISEASE. (Fr.) Manigand, G. (Saint Louis Hosp., Paris), C. Macrez, J. Chome, C. Bosson, J. Delamare and M. Deparis. Presse Med. 72(31):1871-1874, 1964.

The case is presented of a 34-year-old man and his 24-year-old sister who both developed Hodgkin's disease 2 yr. apart. The former died 6 mo. after onset of disease in an icteric state from cardiovascular collapse and anuria; the latter has shown no further progression of the disease. Other members of the family (1 brother and 5 sisters) are free from disease. A review of the literature (51 references) with regard to this rare familial incidence is included.

- 65-632 THE PROBLEM OF PRECANCER OF THE STOMACH. (Rum.) Kandelis, V. A. (Clin. Gen. Surg., Inst. Med., Donetsk, USSR). Oncol. si Radiol. 3(1):17-26, 1964.

A pathogenic relationship was established between the process of malignant transformation involving the mucous membrane of the stomach and the alteration of gastric excretory function after the experimental reproduction of secretory atrophic gastritis in dogs. Gastric polyposis, a condition heralding the precancerous state, was found to be linked to secretory atrophic gastritis. Systematic injury due to the action of secreted factors of the nervous and glandular apparatus of the stomach provides the cause determining the period of transition towards malignant transformation.

- 65-633 CRYSTALS OBSERVED IN STORED BLOOD OF PATIENTS WITH ACUTE LEUKEMIA. (Fr.) Tanret, P. (Paul Brousse Hosp., Villejuif, Seine, France) and L. Balan. C. R. Acad. Sci. (Paris) 259(1):262-265, 1964.

Crystals were seen to appear in the plasma of stored blood from leukemia pts. at intervals varying from 15 days to >1 yr. The physico-chemical properties of the crystals are described in detail. Upon inj. of 0.1 mg of the crystals from a pt. into newborn C57-B16 mice (in which spontaneous cancer and leukemia are rare) retarded growth followed by lethal disease was observed in 11/13 animals within 4-7 wk. The disease was accompanied by the appearance of large cells with cytological abnormalities in the bone marrow, lungs and blood. Inj. of the crystals into adult mice did not produce these effects, but mating of these adults produced some

offspring which died at ages varying from 8 days to 7 wk. without the stunting syndrome. Autopsy revealed the presence of abnormal cells in the same organs as those of the inj. mice. The inj. of crystals from different pts. produced the same lethal disease in 50% of inj. mice.

- 65-634 DIFFERENTIATION OF NEOPLASTIC CELLS. THE MULTIPHASIC EVOLUTION OF HUMAN NEOPLASMS. (Rum.) Eskenasy, A. (Dept. Path. Anat., Inst. Physiol., Bucharest, Rumania). Stud. Cercet. Stiint. (Med.) 14(2):389-403, 1963.

Experimental studies on the morphogenesis of tumors have revealed the existence of 2 phases separated by a latent period: an initial, or differentiation, phase and a realization, or proliferative, phase. The conditions determining the passage from one phase to the other are discussed. The multiphasic evolution and factors accompanying the abrupt transformation from the benign to the malignant state are analyzed for uterine leiomyofibromas, pigmented nevi, osteoclastic reticulomas, giganto-follicular lymphoblastomas, myeloid leukemias, bronchial carcinoids and Reclus' mastopathy.

- 65-635 THE IMPLANTATION OF LYMPHOSARCOMA OF *XENOPUS LAEVIS* INTO REGENERATING AND NON-REGENERATING FORELIMBS OF THAT SPECIES. (E.) Ruben, L. N. (Inst. Exp. Zool., U. Geneva, Switzerland) and M. Balls. J. Morph. 115(2): 225-231, 1964.

Lymphosarcoma implantation into limbs of post-metamorphic *X. laevis* resulted in intense inflammatory reactions which appeared to destroy the donor cancer material as well as its metastases and to cause regression of the regenerating limbs. The unimplanted, previously amputated limbs regress after cancer is placed within the non-amputated contralateral forelimb. It was concluded that an individuation field in a post-metamorphic amphibian exerts no effective control upon the growth or metastatic behavior of this tumor. (See also CRA 2(5):#823, 1964 and *ibid.* 3(3):#478, 1965.)

- 65-636 OSTEOSARCOMA OF THE FOURTH COCCYGEAL VERTEBRA IN AN 8-YEAR-OLD DUTCH COW. (Fr.) Lombard, C. and E. Puget. Bull. Acad. Vet. Franc. 36(5):227-233, 1963.

In this case report the rarity of osteosarcomas in cows is mentioned, and the incidence and distribution of osteosarcomas in other domestic animals are reviewed (6 references).

- 65-637 MALIGNANT TRANSFORMATION OF HYPERFUNCTIONAL THYROID CELLS AND THYROID CELLS INVOLVED IN COMPENSATORY REGENERATION.

(Rum.) Simionescu, N., E. Angelescu and D. Stoenescu. Stud. Cercet. Endocr. 13(4): 549-555, 1962.

In a study of 180 pts. with simple hyperthyroid goiter and 86 pts. with Basedow's disease who underwent surgery, 5% and 11%, resp., developed malignancies. Of the pts. with hyperfunctional goiter, 9/10 developed adenocarcinomas; of the 11 Basedow pts., 8 developed adenocarcinomas and 2 carcinomas. Most pts. had received thiouracil treatment after surgery, which may have been implicated in the increased susceptibility to malignancy. A brief review (8 references) of pertinent literature is included.

- 65-638 PRECANCEROUS LESIONS OF THE SKIN. (E.) Belisario, J. C. (Inst. Derm., Roy. Prince Alfred Hosp., Sydney, Australia). Acta Un. Int. Cancr. 20(3):681-686, 1964.

In addition to material previously reported in CRA 1(7):#1398, 1963, the author examines various precursors of skin cancer in Australia. Skin cancer comprises approx. 60% of all cancers in Australia. The commoner precursors include solar keratoses, leukoplakia, cutaneous horns, Bowen's disease, keloid and scars. Incidence of melanoblastoma from moles or clinically normal skin may be increased by sunlight.

- 65-639 PRECANCEROUS LESIONS OF THE MAMMARY GLAND. HUMAN AND EXPERIMENTAL. (E.) Severi, L. (Div. Cancer Res., U. Perugia, Montelupe, Italy). Acta Un. Int. Cancr. 20(3): 687-690, 1964.

The development of mammary cancer as the end-point of a slow proliferative process consisting of epithelioses forming multilayered linings, solid fillings or papillary ingrowths is discussed. A similarity of these findings was noted between humans and high cancer-strain mice such as female force-bred RIII x C57b and normally bred substrain RIII/Dm/Se. The spontaneous development of mammary cancer in a normal gland, however, cannot be excluded. Full development of the mammary glandular tree appears to be necessary before the pre-malignant changes leading to tumor formation can occur.

- 65-640 THE APPENDIX IN RELATION TO NEOPLASTIC DISEASE. (E.) McVay, J. R., Jr. (Dept. Surg., St. Mary's Hosp., Kansas City, Mo.). Cancer 17(7):929-937, 1964.

In a study of autopsy material from 914 pts. 30 yr. or older, it was found that the incidence of previous appendectomy in 229 pts. dying from colonic carcinoma was 18.3% compared to 10.6% in a control group of 591 pts. who died of other diseases. This difference in incidence was independent of age or sex. In 198 pts. with various

other neoplasms such as carcinoma of the lung, breast, cervix, stomach or pancreas, incidence of previous appendectomy was 12.6%. Concurrent cholecystectomy or oophorectomy were ruled out as having any effect on the increased incidence of neoplasms noted in the group with previous appendectomy. It is believed that the appendix might have a protective effect against certain enteric viruses which may cause malignant alterations in the colon or other anatomical sites.

65-641 A SPONTANEOUS TRANSPLANTABLE OVARIAN TUMOUR OF THE CBA MOUSE. (E.)

Whiteley, H. J. (Dept. Path., Welsh Natl. Sch. Med., Cardiff) and D. L. Horton. Brit. J. Cancer 18(2):252-254, 1964.

A spontaneous granulosa cell ovarian tumor of a 2.25-year-old CBA mouse was transplanted in male and female Swiss mice of varying ages. Growth patterns of the tumor changed with i.p. and s.c. serial passages until the final form reached was that of a pleomorphic sarcoma.

65-642 LOSS OF NEOPLASTIC PROPERTIES IN VITRO. I. OBSERVATIONS WITH S-180 CELL LINES. (E.)

Foley, G. E. (Dept. Microbiol., Child. Cancer Res. Found., Boston, Mass.) and B. P. Drolet. Cancer Res. 24(8):1461-1467, 1964.

Cell lines isolated from the CCRF-180 subline of Sarcoma 180 which was maintained in CFW mice lost their tumorigenic capacity in these mice and in the cheek pouches of Syrian hamsters between in vitro passages 26 and 85 (230-824 days after isolation). These cell lines and more recently isolated cell lines derived from the same subline, but which still maintained their tumorigenic properties, grew in Eagle's basal medium and required no L-tryptophan other than that supplied by 10% whole or dialyzed horse or calf serum. Cell lines similarly derived from normal tissues of CFW mice required additional quantities of L-tryptophan for max. growth. In addition to the loss of their tumorigenic properties, cell lines showed changes in certain cytochemical parameters. These studies do not elucidate events underlying these alterations in biologic and cytochemical characteristics.

65-643 CELLULAR AUTOREGENERATION. VI. NODAL DIVISION UNDER NORMAL AND CANCEROUS CONDITIONS (INTENSE AND BRUSQUE-SYNCHRONOUS DIFFERENTIATION OF CELLULAR DIVISION). (Rum.)

Mirza, V. D. (Dept. Biomorph., Rumanian Acad. Sci., Iasi) and A. Brătianu. Stud. Cercet. Stiint. (Med.) 14(2):231-261, 1963.

In a discussion of cellular regeneration, the author describes a third category (the other 2 were described in previously published works) of cellular differentiation, namely a brusque, synchronous method known also as nodal (hemiheteroplastic or selective or asymmetrical) division. Among the various subgroups of nodal division, subgroup A (simple nodal division) was found to be characteristic of cellular division in medulloblastomas, prickle cell epidermal epitheliomas, medulloblastomas of the cerebellum and malignant transformation of pigmented nevi.

65-644 CARCINOMA WITHIN A CHRONIC BURN SCAR (MARJOLIN'S ULCER). REPORT OF A CASE. (E.)

Geller, S. A. (Lenox Hill Hosp., New York, N. Y.), L. H. Kurtz and M. W. Spellman. Med. Ann. D. C. 33(12):620-622, 1964.

65-645 IMMUNOLOGICAL ENHANCEMENT OF SARCOMA 180 GROWTH IN C57BL/6 J MICE. (E., Abstract)

Bradner, W. T. (Res. Div., Bristol Lab., Syracuse, N. Y.) and M. H. Pindell. Proc. Am. Assn. Cancer Res. 5(1):7, 1964.

65-646 THE APPARENT INDUCTION OF PRIMARY, MULTICENTRIC, MALIGNANT MELANOMA IN THE SYRIAN (GOLDEN) HAMSTER. (E., Abstract)

Fortner, J. G. (Memorial Ctr., New York, N. Y.). Proc. Am. Assn. Cancer Res. 5(1):19, 1964.

Induction of tumors was accomplished by the inj. of splenic tissue from a hamster with spontaneous cancer.

65-647 CARCINOMA OF THE COLON AND ILEUM IN CHRONIC ULCERATIVE COLITIS WITH REFLUX ILEITIS. REPORT OF A CASE OF A SIXTEEN-YEAR-OLD BOY. (E.)

Brown, C. H. (Dept. Gastroent., Cleveland Clin. Found., Ohio), R. J. Diaz and W. M. Michener. Gastroenterology 47(3):306-312, 1964.

65-648 SQUAMOUS CELL CARCINOMA WITH FACIAL HEMIPARESIS DEVELOPING AFTER PLANING OF THE SKIN FOR THE PREVENTION OF ACTINIC KERATOSES AND MALIGNANCY. (E.)

Domonkos, A. N. Arch. Derm. (Chicago) 90(4):444-445, 1964.

A case report.

65-649 A CALCIFYING MUCOID CARCINOMA OF THE COLON IN A BANTU CHILD. CASE REPORT. (E.)

Lurie, A. (S. Afr. Inst. Med. Res., Johannesburg) and H. M. Selvey. S. Afr. J. Surg. 2(1):21-27, 1964.

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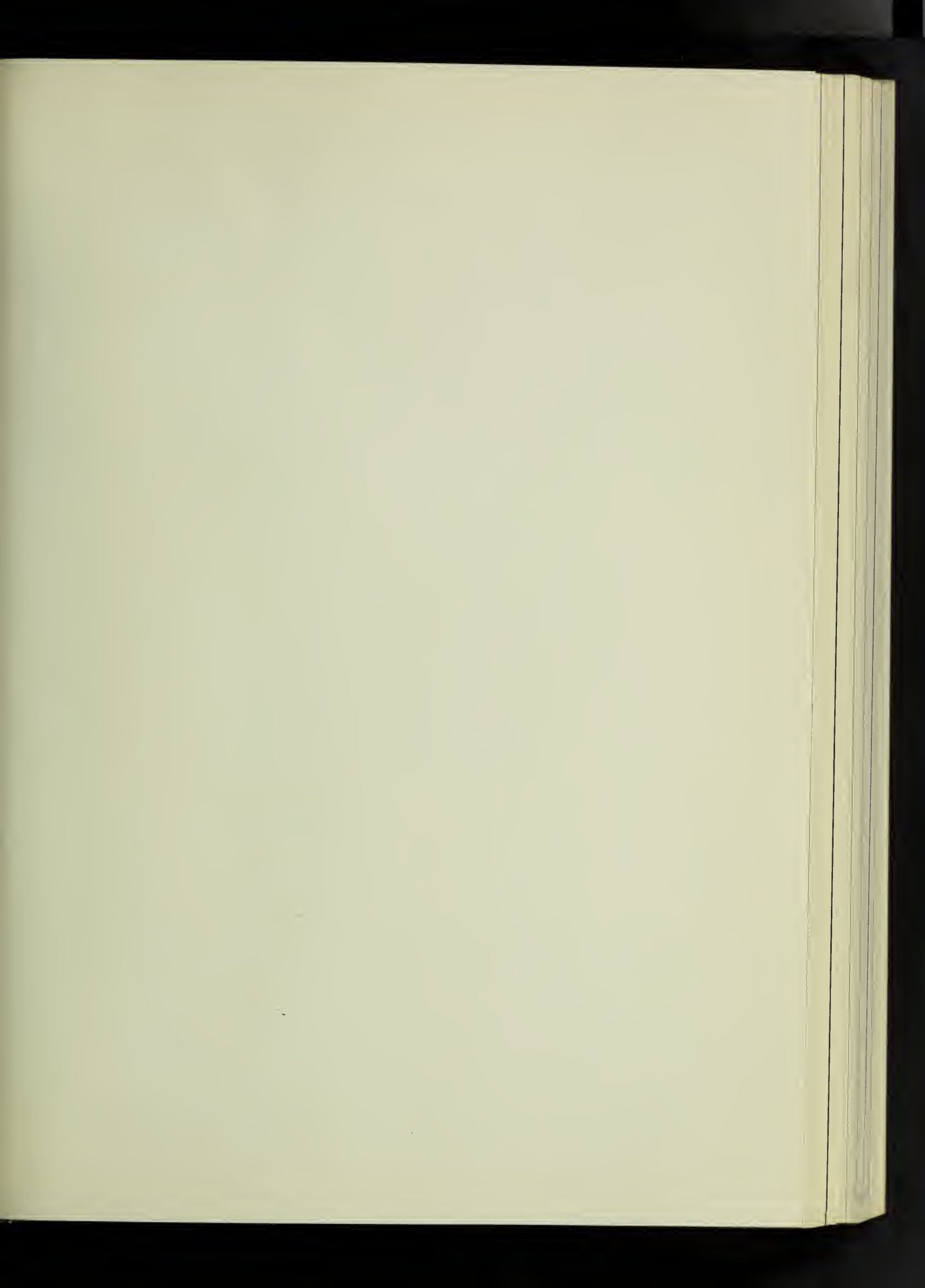
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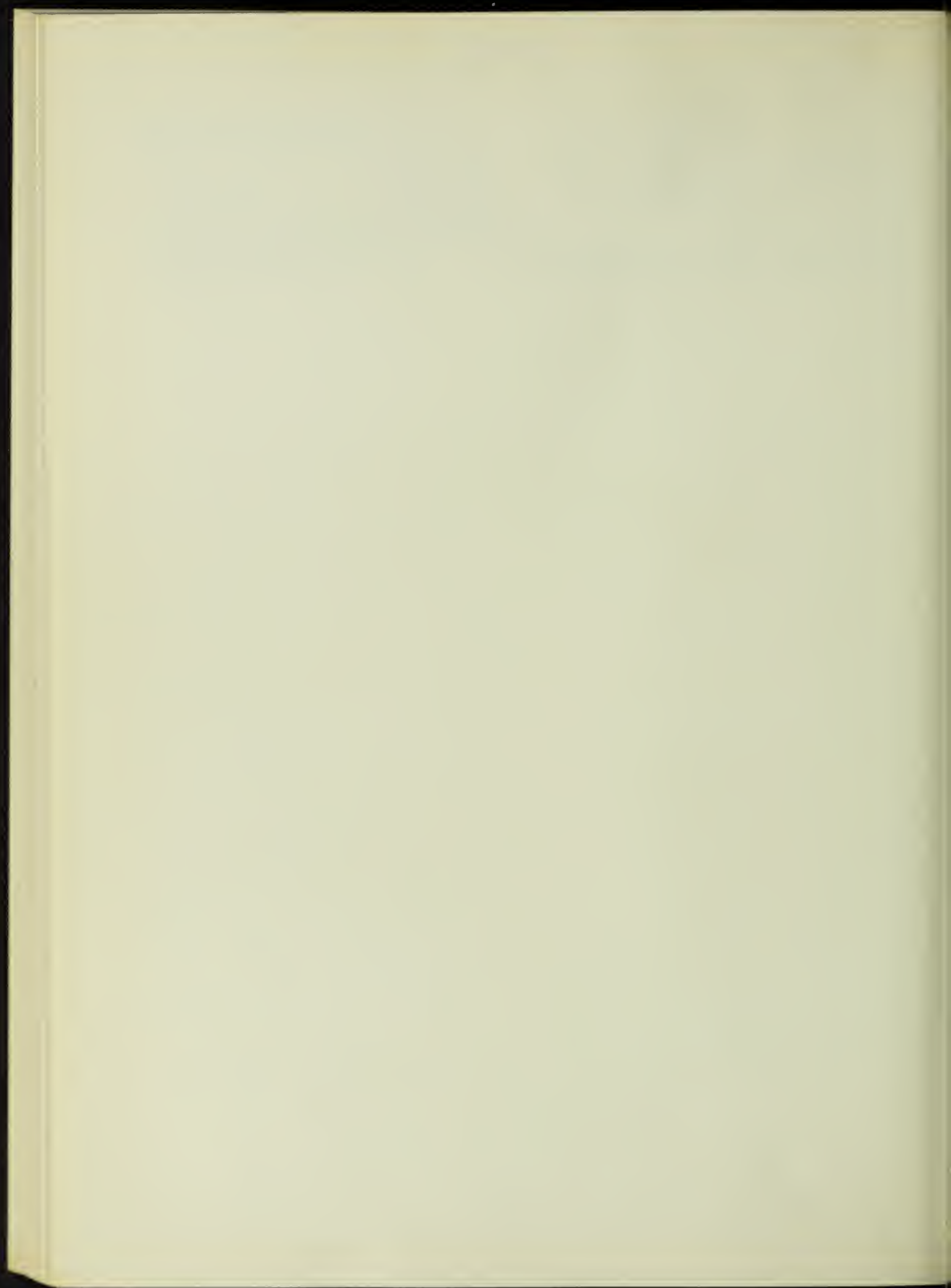
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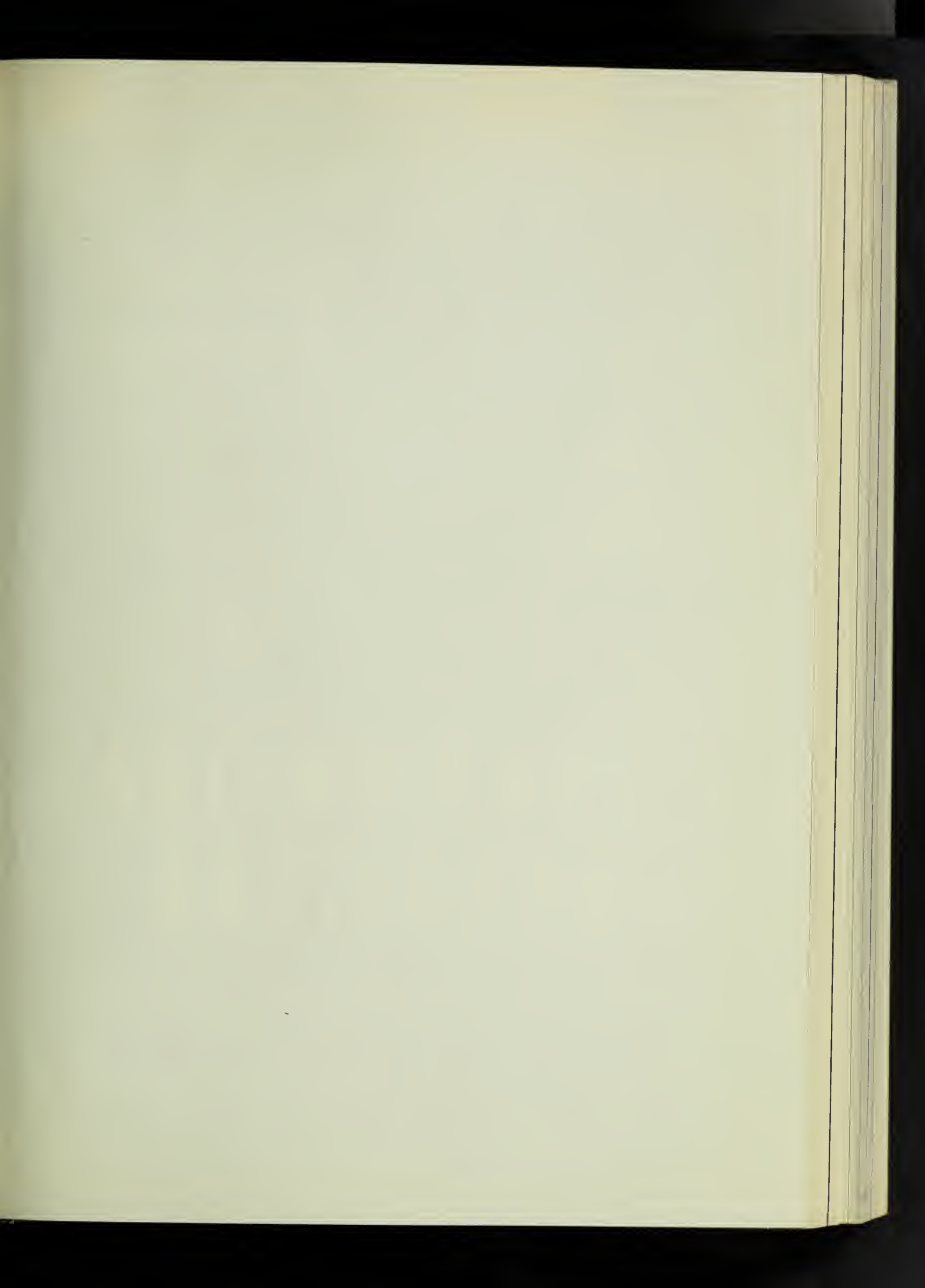
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CARCINOGENESIS ABSTRACTS

National Cancer Institute

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE Public Health Service

The National Cancer Institute, in response to Congressional interest and desire for a national program of cooperative research in cancer, is establishing a means whereby information in the field of carcinogenesis will be coordinated and made available. The information to be included will be obtained from the National Cancer Institute, other governmental agencies, and non-governmental research institutions.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by Index Medicus. If the journal is not covered by Index Medicus, then the abbreviations (with some modifications) found in World Medical Periodicals, 3rd Edition, are used.

ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	(cytopathic effect)	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	Ic.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	Ind.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

65-650 EPIDEMIOLOGICAL OBSERVATIONS ON SUSCEPTIBILITY TO CANCER IN MAN WITH SPECIAL REFERENCE TO AGE. (E.) Doll, R. (Statist. Res. Unit, London Sch. Hyg. Trop. Med., W.C 1, England). Acta Un. Int. Cancr. 20(3):747-752, 1964.

A review of the literature indicates that heredity has little effect on the susceptibility to cancer as a single entity, but may influence the development of particular types of cancer. The data also do not show a significant difference between sexes in their susceptibility to cancers not related to sex organs. Sensitivity to cancer induced by various factors such as industrial carcinogens, cigarette smoking or exposure to radiation is shown by some reports to increase with age among adolescent and adult men, while other data appear to contradict this age relationship. The possible reasons for this difference are discussed. (See also CRA 2(4):#743, 1964.) (No references)

65-651 BIOCHEMISTRY OF CANCER. (E.) Busch, H. (Dept. Pharmacol., Baylor U. Coll. Med., Houston, Texas) and W. C. Starbuck. Ann. Rev. Biochem. 33:519-570, 1964.

Included in an extensive review of the biochemistry of cancer cells is a discussion of chromosome number, DNA, RNA, ribosomes, nuclear proteins, stones, tumor nutrition, the production of abnormal substances by cancer cells and glycolysis. (77 references)

65-652 CANCER IMMUNOLOGY. (E.) Editorial. WHO Techn. Rep. Ser. (286):49-54, 1964.

A summary of immunologic research (part of a report of Five Scientific Groups), brief reports from experimental studies on the antigenicity of chemical- and virus-induced mouse tumors and their immunologic interrelations are given, along with the possible significance of these findings for cancer prevention. Borderline areas are explored between cancer immunology and tissue transplantation (from which theories of immunologic carcinogenesis may be derived), and between cancer immunology and somatic cell genetics, where antigens may be used as genetic markers. Human tumor antigens (specific antigenicity and immuno-diagnosis) are currently considered unprofitable and risky. The detection in vaccines used for mass inoculation of adventitious infective or tumorigenic viruses (SV-40 and probably fowl lymphoma virus) suggests the need for future study of viral vaccines, human vaccination histories, and the incidence of malignant disease. (No references)

65-653 SPONTANEOUS UTERINE CANCER IN ANIMALS. (E.) Cotchin, E. (Dept. Path., Royal

Veterin. Coll., London, N.W.1). Brit. J. Cancer 18(2):209-227, 1964.

In a review of the literature on the incidence of spontaneous uterine carcinoma in the mare, donkey, mule, cow, sheep, goat, sow, dog, cat and rabbit, no significant incidence of the disease was observed among the various animal species. Further study is suggested, as confirmation of these observations might indicate that specifically human factors are responsible for cervical cancer in women. Endometrial carcinoma, though predominantly a human disease, has shown a significant incidence in rabbits, and may possibly occur with some frequency in cows. The relative general rarity of endometrial carcinoma among the types of animals is in contrast to the high incidence of endometrial hyperplasia in the various species. (167 references)

65-654 THE EXTENT OF HUMAN EXPOSURE TO AIR POLLUTION. (E.) MacKenzie, V. G. (Div. Air Pollut., U.S. Public Health Serv., Washington, D. C.). Arch. Environ. Health (Chicago) 9(5):597-599, 1964.

In a review of the physical, meteorological and industrial factors involved in creating atmospheric pollution, it is stated that individuals living in the U. S. are exposed to amounts of 3,4-benzopyrene (BP) which range from 33-100% the quantity inhaled by a person smoking one pack of cigarettes daily (0.32 µg). Mention is made of a study which shows that workers involved in roof tarring operations inhale as much BP during 8 hr. as is found in the smoke of 210 packs of cigarettes. (3 references)

65-655 AIR POLLUTION AND LUNG CANCER. (E.) Katz, M. (Dept. Nat. Health Welfare, Ottawa, Canada). Med. Serv. J. Canada 20(8):665-676, 1964.

In addition to the material reported in CRA 2(4):#618, 1964, additional data, obtained from various centers in the U.S., Canada and Europe, are presented which indicate that the frequency of pulmonary cancer has increased in direct proportion to the amount of air pollution. (See also CRA 2(4):#617, 1964.) (30 references)

65-656 STUDIES ON THE MOLECULAR MECHANISM OF HYDROCARBON CARCINOGENESIS. (E.) Heidelberger, C. (McArdle Mem. Lab., U. Wisconsin, Madison). J. Cell. Comp. Physiol. 64(2) (Pt. 2): 129-148, 1964.

A review of theoretical and experimental data is presented. The author believes it unlikely that hydrocarbons (HC) could induce cancer as a result of any sort of interaction with DNA. The binding

of HC to DNA, however, has been confirmed. The basic Jacob-Monod regulatory circuit for enzyme induction and repression is stressed in an effort to explain carcinogenesis on the basis of a derangement in metabolic control without the necessity of postulating a direct interaction between the carcinogen and genetic material. (See also CRA 1(5):#876, 1963; and *ibid.*, 2(4):#657, 1964.) (35 references)

- 65-657 CURRENT CONCEPTS OF VIRAL NEOPLASIA. (E.) Bryan, W. R. (NCI, Bethesda). *Southern Med. J.* 57(11):1263-1267, 1964.

A discussion of viral replication within cells, viral leukemia and lymphoma in animals, polyoma and related viruses, and cocarcinogenic viruses is presented. It is stated that the virus acts as a biologic carcinogen, and that human adenoviruses, including types 12 and 18, may play a role in the initiation of some cancers that follow irradiation, or as a result of some other alteration or disease process which decreases or destroys immunological reactivity. One of the significant findings in the area of cocarcinogenic viruses, namely the production of squamous carcinomas of the lung in mice after successive infections with 3 mouse-adapted strains of influenza virus and continuous exposure to an aerosol of ozonized gasoline (a laboratory version of smog), is discussed. (No references)

- 65-658 SMOKING AND MORTALITY. (E.) *Med. J. Aust.* 2(11):423-424, 1964.

Analysis of deaths among British physicians (1951-1960) in relation to their smoking habits (reported in questionnaires) showed a correlation of smoking with deaths from cancer of the lung, upper respiratory and g.i. tracts, and other diseases in males < 65 yr. old; smoking in females was correlated only with lung cancer deaths. The death rates increased linearly with increased smoking (showing no threshold value) and declined among those who reduced or stopped their smoking. (8 references)

- 65-659 VIRUSES AND CANCER. (E.) Gellhorn, A. A. (Dept. Med., Columbia U. Coll. Phys. Surg., New York, N. Y.). *Cincinnati J. Med.* 45(2):51-59, 1964.

A review of the viral nature of avian leukosis, chicken tumors, rabbit myxomatosis, mouse mammary cancer, and rodent leukemias is presented. The mechanism of action of tumor viruses and techniques in tumor virus research are discussed. The DNA and the RNA viral carcinogenesis apparently differ. It appears that a mutation-like event is caused in the host cells during a transient or abortive infection with a DNA virus. With the RNA virus, however, the viral gene controls the conversion of normal protein biosynthetic machinery to the formation of foreign proteins. The analogy of the morphology and biological

behavior of many virus-induced human neoplasms in animals provides strong circumstantial evidence that viruses are also implicated in human tumorigenesis. The failure to demonstrate a viral etiology in human cancer is probably due to the lack of techniques applicable to humans. (No references)

- 65-660 METABOLIC VIROGENS HAVING MUTAGENIC ACTION AND CHROMOSOMAL PREVIRUSES. (E.) Yamafuji, K. (Inst. Agric. Chem., Kyushu U., Fukuoka, Japan). *Enzymologia* 27(4):217-274, 1964.

A review and discussion on the mechanism of abnormal metabolism leading to endogenous virus formation out of cellular nucleoproteins (e.g., virogenic action of H₂O₂, hydroxylamine, oximes, nitrite, hyponitrite, and metabolic mutagens produced in Yamafuji's cycle studied by the author mainly in domestic silkworms under virus-sterilization conditions) are presented. Normal nutritional or metabolic processes produce a series of virogenic and mutagenic substances which may be related to carcinogenesis. (262 references)

- 65-661 CARCINOGENIC ACTIVITY OF SOME DRUGS USED IN PRACTICE (EXPERIMENTAL FINDINGS). (E.) Salyamon, L. S. (Inst. Oncol., USSR Acad. Med. Sci., Leningrad). *Fed. Proc. (Transl. Suppl.)* 23(6)(Pt. 2):T1367-T1368, 1964.

This article is the English version of a Russian article appearing in *Vop. Onkol.* 9(11):22-, 1963. See CRA 1(9-10):#1655, 1964. (15 references)

- 65-662 DISEASES OF THE CHEST OF CHEMICAL ORIGIN. (E.) Hughes, R. (Manufact. Mutual Ins. Ltd., Sydney, Australia). Pp. 227-232 in *Biochemical Clinics*. No. 4 The Lung. Kugelmas, I. N. (Ed.). Reuben H. Donnelly Corp., New York, 1964, 341 pp.

In a review of diseases of the lungs and bronchi caused by various chemicals in dusts and vapors, brief mention is made of asbestos, nickel, chromate, hematite, radioactive dusts, and coal fumes as possible causative agents in the development of lung cancer. It was noted that a high incidence of the disease occurs in miners working with or near these substances. (37 references)

- 65-663 SIDE EFFECTS OF RADIATION, GENETICS, CARCINOGENESIS, AGING AND LEUKEMOGENESIS. (E.) Simon, N. (Dept. Radiother., Mt. Sinai Hosp. New York City), H. J. Muller, C. F. Tessmer and H. F. Henry. *Med. Sci.* 15(10):68-76, 1964.

In a section of radiation carcinogenesis, C. F. Tessmer briefly discusses X-ray-induced human skin carcinoma; radioactive fallout-induced malignant changes in bovine skin; abnormal cellular pleomorphism in the human thyroid long after irradiation; and Thorotrast as an

terogenic carcinogen. N. Simon briefly reviews the evidence for attributing to irradiation the increased incidence of leukemia in radiologists, in pts. with arthritis treated by radiotherapy, in atom bomb survivors, and in children previously irradiated for thymic enlargement. (5 references)

664 POLYOMA VIRUS AND POSSIBLE CARCINOGENIC MECHANISMS. (Sp.) Stewart, S. E. (H, Bethesda). Acta Oncol. (Madrid) 11(2): 1-135, 1963.

A concise review of the literature on experimental studies carried out to elucidate the possible mechanism of carcinogenesis of polyoma virus. See also CRA 1(2):#163; and ibid., (5):#793, (53.) (23 references)

665 LUNG CANCER AND CHRONIC BRONCHITIS. (E.) Med. J. Aust. 1(24):926-927, 1964.

Although smoking is the most important etiological factor in lung cancer, this editorial examines other contributing factors such as air pollution, which is almost certainly the main reason for the high incidence in industrial Britain. In South Africa, where industrial pollution is relatively low, the incidence of lung cancer is substantially higher among British immigrants than among native-born white South Africans, who are said to be the heaviest smokers in the world. An analysis by A. H. Campbell et al revealed that in a group of 99 Australian ex-servicemen (age 50 yr. or over) with lung cancer, the incidence of chronic bronchitis was 74%, as compared to 45% for controls. Among moderate and light smokers, a striking excess of chronic bronchitis was noted in lung-cancer pts. as compared to control pts. who smoked the same amounts. It is concluded from these studies that chronic bronchitis may be a major rather than an occasional factor in determining the genesis of lung cancer. The relationship between smoking and chronic bronchitis is explained in terms of "cocarcinogenesis". (25 references)

666 THE PROBLEM OF HETEROGENEITY IN THE ORGANISM IN CONNECTION WITH AUTOALLERGY AND TUMORIGENESIS. (E.) Vylegshnin, N. I. (Inst. Exp. Physiol., Kazan, USSR). Bull. Inst. Grad. Med. Educ. Res. 6(2):36-43, 1964.

This review emphasizes the fact that however dissimilar autoallergic and tumor diseases may be, they can be considered as diseases of heterogeneity of the organism's physiological structure. (10 references)

667 MOUSE LEUKEMIA VIRUS. ITS CHARACTERISTIC PROPERTIES AS COMPARED WITH MAMMARY

CARCINOMA VIRUS. (Jap.) Tsubura, Y. (Dept. Path., Nara Prefect. Coll. Med., Japan). Sogo Rinsho (Clin. All-Round) 13(7):1291-1303, 1964.

Only newborn mice showed susceptibility to mammary carcinoma viruses; this virus also demonstrated strain specificity. Nucleic acids extracted from Moloney leukemic viruses (MLV) by the Gierer-Schramm and Kirby techniques possessed leukemogenic activity in newborn mice. There was no significant difference in mammary carcinoma incidence in the offspring of mice whose mothers were infected compared to those with uninfected mothers (76/154 and 65/118, resp.). In a study of leukemogenic potency, MLV showed higher leukemogenic potency (18/44, or 41%) when cooled down to -20° to -80°C before inoc. than when used fresh (8/29, or 28%). In another experiment, admin. of MLV (conc. 10⁻¹ and 10⁻²) to dd0 strain newborn mice induced leukemia in 6/10 (60%) and 21/44 (48%), resp., but both conc. failed to induce any mammary carcinoma. When the viruses were admin. (10⁻²) to 3-month-old dd0 mice, however, 4/24 (17%) developed leukemia and 6/10 (60%) developed mammary carcinoma as well. (See also CRA 1(11):#1990, 1964.) (75 references)

65-668 THE PHILADELPHIA CHROMOSOME AND SOME OTHERS. (E.) Hungerford, D. A. (Inst. Cancer Res., Philadelphia, Pa.). Ann. Intern. Med. 61(4):789-793, 1964.

After reviewing the properties and pathogenesis of the Philadelphia chromosome in chronic granulocytic leukemia, the only neoplastic condition in which there has been found a constant and characteristic chromosome change of any kind, the author emphasizes the usefulness of cytogenetic information in other areas of human disease. (25 references)

65-669 BIOCHEMISTRY AND CANCER. MOLECULAR STRUCTURE. (Sp.) Gosálvez Y Gosálvez, M. (Dept. Intern. Med., Nat. Inst. Oncol., Madrid). Rev. Esp. Oncol. 10:187-198, 1964.

In this review, the advances made in the study of carcinogenesis, as a result of the discovery of new and more sensitive methods of investigation, are discussed. Cancer etiopathogenesis is oriented mainly toward 3 fields of investigations: heredity, infections and chemical carcinogenesis. In the latter, special efforts have been made to elucidate the relationship between chemical structure and carcinogenic activity. The application of modern methods of mathematical calculation and electronic analysis of atomic and molecular configurations to the study of the polyaromatic carcinogenic hydrocarbons of the benzpyrene and dibenzanthracene type has indicated that the electron pi are responsible for the carcinogenic activity, more precisely the K and L regions which are characterized by exceptionally high electronic indices. (No references)

- 65-670 THEORETICAL INTERPRETATION OF THE CANCER PROBLEM. PART II. (Ger.) Graffi, A. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin, Berlin-Buch). Hippokrates 34(24):967-973, 1963.

The exogenous and endogenous virus theory and the nucleic acid theory of tumor formation are reviewed in detail. For related papers see CRA 1(12):#2057, 1964; and ibid., 2(3):#398, 1964. (Approx. 150 references)

- 65-671 EMBRYOPATHIES INDUCED IN MAMMALS. (Fr.) Fave, A. (Pfizer-Clin. Lab., Paris). Therapie 19(1):43-164, 1964.

In an extensive review of chemical agents, physical agents, metabolic disturbances, infectious agents, immunologic agents and physiological modifications known to have induced toxic effects in embryos of various mammalian species, experimental studies on the teratogenicity of trypan blue, 20-methyl-cholanthrene, naphthalene derivatives, carbon tetrachloride and ionizing radiations are tabulated. (1,212 references)

- 65-672 CURRENT STATUS OF THE THYMUS GLAND. (E.) Karetzky, M. (Cornell U. Coll. Med., N. Y.) and L. E. Rudolf, Jr. Surg. Gynec. Obstet. 119(1):129-138, 1964.

In a review of recent experimental studies on the thymus and their correlation with newer clinical observations and concepts, the role of the thymus with regard to leukemia is discussed. Examined are the effect of thymectomy on leukemia in mice, a possible hormonal mechanism of thymus function and the leukemogenic role of the thymus in children. (118 references)

- 65-673 MALIGNANT DISEASE IN THE TROPICS. (E.) Hutt, M. S. R. (Dept. Path., Makerere Coll., U. E. Africa, Kampala, Uganda). Practitioner 193:175-182, 1964.

The incidence of malignant disease is reviewed for various countries in and adjacent to the tropics, with special attention to Burkitt's tumor, Kaposi's sarcoma and malignant tropical ulcer. Also discussed are malignancies commonly found in Western countries but with much higher incidence in some tropical countries (cancer of the penis, buccal cavity and oropharynx, liver, nasopharyngeal region, jaw and choriocarcinoma), as well as those malignancies common to both the United Kingdom and the tropics but with certain well-marked differences in the two areas (malignant melanoma, cancer of the esophagus, lung, skin, uterus, g.i. tract and bladder). (22 references)

- 65-674 SELECTION OF PATIENTS FOR 131 TREATMENT. (E.) Tubiana, M. (Gustave-Roussy

Inst., Villejuif/Seine, France). Minerva Nucl. 8(2):82-87, 1964.

In a review dealing with the choice of treatment for pts. with hyperthyroidism, the frequency of thyroid cancer was found to be increased in children and adults who had received irradiation of the cervical region during childhood or adolescence. Treatment with 131 is strongly contraindicated in pts. < 20 yr. old. In older subjects the risk of carcinogenesis is very much smaller following treatment with radiation or 131 . No significant increase in the frequency of leukemia was seen following treatment with 131 . (14 references)

- 65-675 SOME FACTS AND FANCIES ABOUT CANCER. (E.) Horsfall, F. L., Jr. (Sloan-Kettering Inst. Cancer Res., New York). Georgeton Med. Bull. 18(1):37-45, 1964.

A review is presented in which current knowledge on the incidence, treatment, possible cure and possible causative factors of cancer are discussed. Cumulative experimental and epidemiological data have been shown to support many theories regarding carcinogenesis by radiation, chemical agents and viruses. Experimental evidence showing the development of cancer to be related to a permanent alteration induced in somatic cells has been obtained recently in studies of certain oncogenic viruses. Investigations at the molecular level may define the nature of the neoplastic cell on the basis of alterations involving the nucleic acids. (29 references)

- 65-676 ATMOSPHERIC POLLUTION AND PULMONARY TUMORS. (It.) Mor, C. Arch. Ital. Pat. Clin. Tumori 7(1-2):9-17, 1964.

In this review, the author discusses the increased mortality rate from tumors of the respiratory system and its relationship to the polycyclic hydrocarbon content of cigarette smoke, especially 3,4-benzpyrene (BP). Experimental studies indicate that atmospheric pollution is also a major contributing factor. Among objections to these associations are studies which show high pulmonary tumor incidence in such cities as Venice and Reykjavik (both with little atmospheric pollution), and the lower risk of pulmonary tumors among workers exposed to air containing high quantities of BP than among heavy smokers. Previously published studies on atmospheric pollution in Milan are reviewed. The effect of carcinogenic atmospheric hydrocarbons on respiratory mucosa and cilia, as well as their role in experimental tumor incidence in animals, is extensively discussed. (33 references)

- 65-677 AIR POLLUTION AND DISEASE. (E.) Ferris, B. G., Jr. (Harvard Sch. Public Health, Boston, Mass.) and N. R. Frank. Anesthesiology 25(4):470-478, 1964.

review of atmospheric pollution is presented in which the hazard is classified into general (environmental), occupational and individual (personal) types. The association between the incidence of respiratory diseases and air pollution in different geographical areas is made difficult by the variation in the chemical components from one place to another. Impairment of respiratory function has been noted in certain occupational environments. Emphasis is placed on the association between smoking, especially cigarette smoking, and chronic nonspecific respiratory disease. At present, specific elucidations of the mechanisms of causation have not been forthcoming. (8 references)

678 BIOLOGICAL EFFECTS OF RADIATION. (E.) Chadwick, D. R. (Div. Radiol. Health, Dept. Health, Educ. Welfare, Washington, D. C.) and S. P. Abrahams. Arch. Environ. Health (Chicago) 9(5):643-648, 1964.

A comprehensive review is presented of various epidemiological studies on the carcinogenic, mutagenic, genetic and other pathological effects of radiation in man. Tables are included which list several types of epidemiological studies which have been or are being conducted throughout the world. (3 references)

679 ENVIRONMENTAL CARCINOGENESIS. (E.) Breslow, L. (Div. Prev. Med. Serv., California State Dept. Public Health, Berkeley). Am. J. Med. 101(5):371-375, 1964.

A review of environmental carcinogenesis is presented from the following standpoints: universal exposure (sunlight and chemical and radioactive atmospheric pollution); selective exposure of certain groups of people (food customs and occupational hazards in industry and certain professions); personal exposure (various types of tobacco usage); and the transmission of viruses. Other epidemiological and experimental studies are suggested which are designed to help control environmental cancer hazard. (20 references)

680 LUNG CANCER IN THE 19th CENTURY. (E.) Rosenblatt, M. B. Bull. Hist. Med. 39(5):395-425, 1964.

A review is presented of the historical development of the study and knowledge of lung cancer beginning with its designation in 1815 as an "encephaloid" (resembling brain tissue) and proceeding with clinical, histological and pathological discoveries leading to its acceptance as a primary metastasizing cancer. The results of findings during this period (1815-1899), and the progressive refinement of diagnostic techniques are discussed. While the disease was far more prevalent than was generally realized, it is possible to determine the incidence of lung

cancer in the 19th century from available records. (377 references)

65-681 GASTRIC ULCER AS A SITE FOR THE DEVELOPMENT OF STOMACH CANCER. A HISTOPATHOLOGICAL VIEW. (Jap.) Imai, T. (Cancer Res. Ctr., Kyushu U. Sch. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 22(9):1902-1908, 1964.

The author critically examines current histologic findings in support of the fact that carcinoma of the stomach may arise in some instances from chronic gastric ulcer. He believes in the possibility of stomach carcinoma arising from chronic ulcer but suggests a more critical and objective approach to clarifying the issue, since identical histologic pictures can develop from various routes of development. (30 references)

65-682 VIRUS-CARCINOGEN INTERACTIONS. (E.) Martin, C. M. (Dept. Med., Seton Hall Coll. Med., Jersey City, N. J.). Bact. Rev. 28(4):480-489, 1964.

A review is presented in which the *in vivo* interactions of polycyclic aromatic hydrocarbon carcinogens with tumors and non-tumor viruses, bacteria-bacteriophage systems and tissue nucleic acids, are compared with the *in vitro* interactions of these chemical carcinogens with mammalian viruses, bacteriophage, and the nucleic acids of bacteriophage and higher species. Theories of carcinogen mutagenesis based on the biochemical and genetic implications of these interactions are presented. (81 references)

65-683 FOOD-BORNE VIRUSES AND MALIGNANT HEMOPOIETIC DISEASES. (E.) Lemon, H. M. (U. Nebraska Coll. Med., Omaha). Bact. Rev. 28(4):490-492, 1964.

Observations in Nebraska have indicated the possible cross-infection of humans from enzootic malignant lymphoma and leukemia in poultry, pigs and cattle. It is believed that milk- or egg-borne viruses may be very important in the pathogenesis of these diseases in man. (18 references)

65-684 THE RELATIONSHIP OF BLADDER CANCER TO SMOKING. (E.) Lilienfeld, A. M. (Dept. Chron. Dis., Johns Hopkins U. Sch. Hyg. Public Health, Baltimore, Md.). Am. J. Public Health 54(11):1864-1875, 1964.

An extensive review of epidemiological and experimental studies of the relationship between smoking and cancer of the bladder is presented. It is concluded that an association is indicated by the evidence. (19 references)

- 65-685 FAMILIAL TRENDS OF CANCER. (E.)
Nature (London) 204:734-735, 1964.

In a study conducted in New South Wales, Australia, the incidence of cancer among the siblings, parents, aunts, uncles, cousins and grandparents of 99 women with breast cancer (33-75 yr. of age) was compared with the incidence among the relatives of 99 cancer-free controls. Some form of cancer was noted in 87/99 families of the cancer group, with breast cancer occurring in 21/87. Cancer occurred in 80/99 control families, with an incidence of breast cancer in 13/80. Except for breast cancer, the number of cases and types of cancer showed a similar distribution in both groups. A higher incidence of breast cancers, especially among maternal aunts, and all cancers in female relations was noted in the cancer group. (1 reference)

- 65-686 PREVENTION OF CHEMICALLY INDUCED CANCER. ON SOME PRINCIPLES OF PREVENTION OF CANCER INDUCED BY CHEMICAL SUBSTANCES. (E.)
 Shabad, L. M. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Arch. Environ. Health (Chicago) 9(6):770-776, 1964.

Essentially the same material as that reported in CRA 1(3):#357, 1963 is presented in a review of the author's own findings and those of other investigators. (25 references)

- 65-687 PLANT CANCER. (Ger.) Nultsch, W.
 (Inst. Bot., U. Tübingen, Germany).
Deutsch. Med. Wschr. 89(50):2384-2388, 1964.

A review of literature on the characteristics of the plant tumors, principles of tumor induction, and phases of tumor formation is presented. (29 references)

- 65-688 OUTLINES OF VIRAL ETIOLOGY OF TUMORS ACCORDING TO RECENT RESULTS. (Ger.)
 Munk, K. (Inst. Viral Res., Heidelberg, Germany).
Ergebn. Mikrobiol. Immunitätsforsch. 38:223-283, 1964.

In an extensive review of literature there is presented a classification of tumorigenic virus types (DNA, RNA); tumor formation (DNA and RNA viruses, other agents), virus-host-cell-relations in the virulent stage (multiplication cycle, localization of viral multiplication), virus-host-cell-relations during transformation stage (virus-cell morphological changes, loss of contact inhibition factor, increased cell division and growth density, clone formation, tumor formation capacity *in vivo*, metabolic changes, new antigenic properties, chromosomal changes), infectious nucleic acid from tumorigenic viruses, effect on tumor formation (endogenous factors: age, genetic factors, thymus, spleen, hormonal factors; exogenous factors), immunity and tolerance, transmission of tumorigenic viruses, and experiments

on the isolation of the tumorigenic virus types from human tumor tissue. (284 references)

- 65-689 CANCER AND THE ADRENAL. (E.) Huggins, C. B. (Ben May Lab. Cancer Res., U. Chicago, Ill.). Curr. Ther. Res. 7(1):58-65, 1965.

In this review, a brief description of the molecular structure of the carcinogenic aromatic hydrocarbons is presented, and their specific biological effects are discussed. Vulnerability to the adrenocorticolytic effects of 9,10-dimethyl-1,2-benzanthracene (DMBA) was correlated with the corticosterone levels of the adrenals. Protection could be afforded the adrenals by admin. of ACTH or pretreatment with certain aromatic compounds. The adrenocorticolytic effect was believed to be caused by the strong electron donating properties of DMBA, and its precise "fit" in an essential molecular site related to corticosterone. In the rat testis, DMBA caused selective damage to the DNA synthesizing cells, the spermatogonia and primary spermatocytes. The multiplicity of biological effects exhibited by DMBA may be due to different manifestations of a common fundamental action on nucleic acid formation and integrity. (19 references)

- 65-690 MALIGNANT LYMPHOMA IN AFRICAN CHILDREN. (Fr.) Wright, D. H. (Makerere U. Coll. Sch. Med., Kampala, Uganda). Acta Un. Int. Cancr 20(3):645-647, 1964.

A review of the age distribution, clinical symptoms, histology, histochemistry and geographic distribution of childhood malignant lymphoma (Burkitt's tumor) in Africa. Over 200 cases have been observed in Uganda during the 10 yr. prior to this report. The tumor geographic distribution appears to be related to that of certain arthropods with the possible implication of an insect-borne virus. (No references)

- 65-691 ORAL CONTRACEPTIVES AND BREAST CANCER. (E.) Stoll, B. A. (Peter MacCallum Clin., Melbourne, Australia). Brit. Med. J. 2:875, 1964.

The author discusses the reported (see CRA 3(4):#761, 1965) occurrence of breast cancer in a woman taking oral contraceptives. He notes that experimental evidence to date has shown that the progesterone-estrogen combination has depressed and not stimulated tumor growth. (3 references)

- 65-692 PRESENT PROBLEMS IN THE STUDY OF CANCER A REVIEW OF THE WORK BY G. MATHE. (Fr.) Kocher, J. (2 Warens Ave., Geneva, 1200, Switzerland). Praxis 53(42):1394-1401, 1964.

A general discussion dealing mostly with material previously reported in CRA 1(4):#594, #595, #596,

97, #598; *ibid.*, (6):#1040; and *ibid.*,
(6):#1561, 1963 of the work of G. Mathé and
workers.

693 RADIATIONS AS A LEUKEMOGENIC FACTOR.
(Sp.) Cifarelli, F. P. (Dept. Radiol.,
Univ. Litoral Sch. Med., Rosario, Argentina).
Rev. Asoc. Med. Argent. 78(5):246-251, 1964.

A discussion of recent experimental investi-
gations, the author concludes that there is ac-
cumulating evidence showing that radiations may
induce leukemia in man through various and com-
plex mechanisms. (69 references)

694 VIRAL ETIOLOGY OF MOUSE MAMMARY TUMORS.
(Fr.) Lasfargues, E.-Y. (Dept.
Microbiol., Columbia U., New York, N. Y.).
J. Natl. Med. 35(8):901-908, 1964.

A review of the experimental evidence accumulated
in the literature showing the significant role
played by the virus in the milk factor in the in-
duction of mammary tumors and dealing mainly
with previously reported material (see CRA 1(3):
8, 1963). (34 references)

695 VIRUS AND HUMAN LEUKEMIAS. (Fr.)
Cooper, E. H. (St. Mary's Hosp., London,
England). *Rev. Franc. Etud. Clin. Biol.* 9(7):
1-692, 1964.

A brief review of the literature on the ex-
perimental evidence accumulated in favor of the
association of a viral agent with leukemia in man,
the author discusses mainly the findings by
Negroni on the isolation of virus from leukemic
cells. (8 references)

696 LONG-TERM TISSUE CULTURES AND CELL
MALIGNIZATION. (Rus.) Timofeevskii,
I. (Inst. Exp. Clin. Oncol., USSR Acad. Med.

Sci., Moscow). *Vestn. Akad. Med. Nauk SSSR*
19(11):3-9, 1964.

A review article discussing the physicochemical
changes during "spontaneous" malignization
in vitro, the characteristics of the transformed
and malignantly degenerated cells and chemically
induced carcinogenesis. (26 references)

65-697 SOME EXPERIMENTAL DATA ON PRECANCER.
(Rus.) Shabad, L. M. (Inst. Exp. Clin.
Oncol., USSR Acad. Med. Sci., Moscow). *Vestn.*
Akad. Med. Nauk SSSR 19(11):17-23, 1964.

See CRA 1(2):#171, 1963. (39 references)

65-698 SOME BASIC DIRECTIONS IN THE SCIENTIFIC
WORK IN USA IN THE FIELD OF
CARCINOGENESIS AND CANCER PROPHYLAXIS. (Rus.)
Shabad, L. M. (Inst. Exp. Clin. Oncol., USSR
Acad. Med. Sci., Moscow). *Vestn. Akad. Med.*
Nauk SSSR 19(11):76-80, 1964.

An account of some of the work done in the field
of carcinogenesis in the USA. (No references)

65-699 VIRUSES AND SKIN TUMORS. (E.) Coriell,
L. L. (S. Jersey Med. Res. Found.,
Camden, N. J.). Pp. 75-90 in TUMORS OF THE SKIN.
Cumley, R. W., J. McCay, D. Aldridge, S. Connelly,
J. Haroz, A. Reiner and W. White (Eds.). Year
Book Med. Publ., Inc., Chicago, 1964, 322 pp.

See CRA 1(2):#170, 1963. (57 references)

65-700 X-RAY INDUCED SKIN CANCER IN MAN. (E.)
Traenkle, H. L. (Roswell Park Mem. Inst.,
Buffalo, N. Y.). Pp. 67-74 in TUMORS OF THE SKIN.
Cumley, R. W., J. McCay, D. Aldridge, S. Connelly,
J. Haroz, A. Reiner and W. White (Eds.). Year
Book Med. Publ., Chicago, 1964, 322 pp.

See CRA 1(2):#186, 1963.

See also abstract nos.: 701,880,944

PHYSICAL CARCINOGENESIS

- 65-701 SOME PROBLEMS IN THE STUDY OF RADIATION
EPIDEMIOLOGY. (E.) Brues, A. M.,
D. Grahn and H. Auerbach. Trans. Am. Clin. Climat.
Assn. 75:102-110, 1963.

In a discussion which follows a review of radiation epidemiology, W. L. Palmer reports that a follow-up study of about 1400 pts. treated with X-irradiation (total depth dose approx. 1650 r) for peptic ulcer between 1937 and 1955 showed no difference in the frequency of leukemia in this group as compared with controls. The review (26 references) includes data previously published by the authors and other investigators on leukemia incidence following X-ray treatment for ankylosing spondylitis, in Hiroshima and Nagasaki, among radiologists and among X-irradiated infants and children, as well as on bone tumor incidence in Illinois in connection with watch-dial painting.

- 65-702 THEORETICAL APPROACH TO LIFE SPAN
SHORTENING INDUCED BY RADIATION. IV.
A MODEL FOR RADIATION INJURY. (E.) Sato, F.
(Nat. Inst. Radiol. Sci., Chiba, Japan). Nippon
Acta Radiol. 24(3):211-237, 1964.

One factor determining the maximum permissible human exposure to radiation, as considered in the Recommendation of the International Commission on Radiological Protection, is the shortening of the life span as a late effect of irradiation. The author develops here the framework for a vector-matrix-form mathematical model for estimating this radiation injury hazard. Assumptions include: organ injury; organ-to-organ interaction; time-dependence of the injury; normal distribution for individual variations in sensitivity to irradiation. The proposed model agreed fairly well, in some respects, when compared with actual experimental data on time and mode of death, recovery, and 30-day LD₅₀ for partial body irradiation. An appendix presents pertinent equations.

- 65-703 THE FREQUENT DEVELOPMENT OF LEUKEMIA
AMONG MAMMARY CARCINOMA PATIENTS TREATED
BY RADIATION. (Jap., Abstract) Kurikan, M.
(Dept. Radiol., Tokyo Med. Dent. Coll., Japan).
Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta
Radiol.) 23(4):555-557, 1963.

During an 8-yr. period (1953-60), 6 cases of leukemia of various types (no details) were reported to have developed following therapeutic radiation for mammary carcinoma. All pts. were female; 4/6 were between 40 and 44 yr. old and 2/6 between 55 and 59 yr. old. The av. latent period was 4.5 yr. for the younger age group and 3 yr. for the older age group.

- 65-704 A CASE OF CHRONIC RADIATION-INDUCED
ULCERATION TAKING THE COURSE SIMILAR
TO THAT OF A NOMA. (Jap.) Kaneyuki, T. (Dept.

Surg., Yamaguchi Prefect. Coll. Med., Japan),
T. Kotani and N. Iki. Rinsho Hoshasen (Clin.
Radiography (Tokyo)) 9(9):755-758, 1964.

The case is reported of a squamous cell carcinoma of the mandible which developed in a 15-year-old male from an ulceration of the cheek (resembling noma) appearing 9 yr. after radiation therapy (total dose of 12,974 r X-rays and 56.5 mg-hr. radium) for lymphangioma and papilloma of the tongue given during the preceding 9-yr. period.

- 65-705 PREVAILING EXPOSURE TO RADIATION OF THE
POPULACE IN UPPER AUSTRIA IN RELATION
TO THE MORBIDITY STATISTICS. (Ger.) Jarosch,
(18 Humbold St., Linz, Germany). Deutsch. Zsch
Ges. Gerichtl. Med. 55(3):148-155, 1964.

Tabulations are presented of prevailing natural and man-made radiation sources, of deaths due to malignancies (2444 cases in 1960, 2435 in 1961, 2580 in 1962), and of malignant formations at various sites for both sexes together and separately and for survivors and the deceased in 1961, and 1962.

- 65-706 EVIDENCE OF RADIOMIMETIC ACTIVITY IN
SPUTUM SMEARS OF COLLEGE STUDENTS.
(E., Abstract) Cunningham, F. C. (Dept. Biol.,
Newton Coll. Sacred Heart, Mass.). J. Cell. Bi
23(2):115A, 1964.

Deep cough sputum smears of college student volunteers with no history of radiation therapy, stained by the Papanicolaou procedure, showed among 6% of nonsmokers and 25% of smokers, the classical picture of irradiation injury shown in the smears of their radiation-treated controls. Dyskaryotic changes, disappearance of cytoplasm and ghost cells (radio footprints) were found; last being associated with a fine sprinkling of cells with carbon particles. Excessive hyperkeratinization was also found among smokers. The radiation-like effects are attributed to atmospheric smoke in nonsmokers, to cigarette smoking in the others. It is suggested that radioactive polonium in cigarette smoke might also be involved.

- 65-707 AUTOPSY STUDY OF LEUKEMIA IN HIROSHIMA
(E.) Anderson, R. E. (Dept. Path.,
U. California Sch. Med., Los Angeles), T. Yamamoto,
A. Yamada and D. W. Will. Arch. Path. (Chicago)
78(6):618-625, 1964.

A report of 157 leukemia cases autopsied at the Atomic Bomb Casualty Commission, Hiroshima, during 1949-62 revealed the following types of leukemia and distribution: myelogenous (ML; 48 acute, 16 subacute, 41 chronic); lymphatic (30 acute, 3 subacute); 5 each of acute myelomonocytic (Naegeli type) and acute stem cell; 3 acute monocytic (Schilling type); 6 acute leukemia (type

unknown). A comparison between proximally exposed (0-1,399 m from hypocenter) and distally exposed (1,400-10,000 m) revealed that proximally exposed cases of acute and chronic ML had a shorter clinical survival after the onset of symptoms ascribable to leukemia and this same group had much smaller spleens than the distally exposed group. Diffuse bone marrow fibrosis was increased in proximally exposed cases of chronic ML, and, compared to leukemic individuals without this finding, was associated with a longer clinical course. The possible interpretations of these findings are discussed. It was not possible to identify an individual case as radiation-induced.

5-708 CARCINOMA OF THE THYROID FOLLOWING TREATMENT OF HYPERTHYROIDISM WITH RADIOACTIVE IODINE. (E.) Karlan, M. S. (9730 Wilshire Blvd., Beverly Hills, Cal.), W. F. Pollock and H. Snyder, Jr. Calif. Med. 101(3):196-199, 1964.

A detailed case history is presented of an 11-year-old girl with papillary adenocarcinoma of the thyroid which was diagnosed 23 yr. after radioactive iodine (¹³¹I) therapy for thyrotoxicosis. During an earlier period, the pt. had received considerable irradiation to the upper chest area in order to investigate a cardiac problem.

5-709 PHOTSENSITIZING ACTION OF AROMATIC HYDROCARBONS DURING THE CATABOLISM OF POLYMETHACRYLIC ACID METHYL ESTERS (PMAE) UNDER UV-IRRADIATION. (Ger.) Siewert, H. (Inst. Biol. Res., Humboldt U., Berlin). Zschr. Naturforsch. (B) 19b(9):806-809, 1964.

Sensitizing properties of anthracene, pyrene, 1,2-benzpyrene (1,2-BP), 3,4-benzpyrene and 2,3,4-dibenzpyrene (DBP) were studied. DBP and 1,2-BP are not photosensitizers. PMAE hydrocarbon in toluene or benzene were UV-irradiated. A relationship was found between the sensitizing action and carcinogenesis. The greater catabolism of PMAE in benzene than in toluene is due to a direct influence of the solvent.

5-710 A FOLLOW-UP STUDY OF WORKERS FROM AN ASBESTOS FACTORY. (E.) Elwood, P. C.

and A. L. Cochrane. Brit. J. Industr. Med. 21(4):304-307, 1964.

A study was conducted on 1,024 men and 237 women who worked in a chrysotile asbestos factory in South Wales, Great Britain from 1936-1962. Among 127/144 in whom the causes of death were known, neoplasms caused 24 deaths: stomach, 3; lung, bronchus and pleura, 12; breast and uterus, 1; other sites 8. Mesothelioma of the pleura was noted in a 47-year-old man first exposed to asbestos 21 yr. prior to death. Carcinoma or adenocarcinoma of the lung or bronchus occurred in 11 men aged 50-73 yr., who were first exposed to asbestos 5-26 yr. prior to death. Among 46 men first exposed to asbestos 15 or more yr. prior to death, there were 10 cancer deaths of which 7 were neoplasms of the lung, bronchus and pleura; the expected numbers were 9.10 and 3.02, resp. The data suggest an association between chrysotile asbestos and carcinoma of the lung or bronchus, but indicate no correlation with mesothelioma or abdominal tumors.

65-711 STATISTICAL OBSERVATIONS OF LEUKEMIA ARISING DURING THE PAST 18 YEARS AMONG THOSE EXPOSED TO ATOMIC BOMB EXPLOSION IN NAGASAKI. (Jap., Abstract) Itoga, T. (Cent. Lab., Nagasaki U. Sch. Med., Japan). Kyushu Ketsueki Kenkyu Dohokaishi (J. Kyushu Hemat. Soc.) 13(3 & 4): 266, 1963.

A total of 337 leukemia cases were collected from various sources in Nagasaki during the period 1946-63; of these, 104 cases had been exposed to the atomic blast. The incidence of leukemia (most frequently chronic myeloid) among subjects exposed within 2,000 m of the hypocenter was 232/1,000,000, approx. 10 x the incidence found in the general public. The incidence of leukemia in exposed subjects reached its peak in 1950 and 1951 (except for a temporary rise in 1958) and decreased in gradually subsequent years. Of interest is the fact that leukemia incidence in non-exposed subjects has been steadily increasing since 1956, with a peak in 1961.

65-712 BRONCHIOLO-ALVEOLAR TUMORS OF THE CANINE LUNG FOLLOWING INHALATION OF PLUTONIUM PARTICLES. (E.) Clarke, W. J. (Biol. Lab., General Electric Co., Richland, Washington), J. F. Park, J. L. Palotay and W. J. Bair. Am. Rev. Resp. Dis. 90(6):963-967, 1964.

See CRA 2(3):#436; and ibid., (7):#1253, 1964.

See also abstract nos.: 674, 675, 678, 679, 686, 692, 693, 700, 760, 785, 829, 917, 922, 933, 980

CHEMICAL CARCINOGENESIS

65-713 ELECTRONIC ASPECTS OF THE INTERACTIONS BETWEEN THE CARCINOGENS AND POSSIBLE CELLULAR SITES OF THEIR ACTIVITY. (E.)

Pullman, B. (Inst. Physico-Chem. Biol., U. Paris, Sorbonne). *J. Cell. Comp. Physiol.* 64(2)(Pt. 2): 91-109, 1964.

See CRA 2(3):#495 and #496, 1964. (See also CRA 1(3):#421, 1963.)

65-714 VERRUCOSE "SNUFF DIPPER'S" CARCINOMA OF THE ORAL CAVITY. A CASE OF SELF-INDUCED CARCINOGENESIS. (E.) Stecker, R. H. (Mayo Clin., Rochester, Minn.), K. D. Devine and E. G. Harrison, Jr. *J.A.M.A.* 189(11):838-840, 1964.

A 71-year-old man who had been a "snuff dipper" for more than 40 yr. presented with an infiltrating verrucose squamous carcinoma of the oral cavity which had originated 4 yr. earlier at the site of application of snuff. A review (8 references) of 55 cases of this disease is presented.

65-715 LENGTH OF CIGARETTE ENDS AND INHALING. (E.) Higgins, I. T. T. (Med. Res. Coun., Cardiff, England). *Brit. J. Industr. Med.* 21(4):321-323, 1964.

In a study conducted among miners and ex-miners aged 35-64 yr., it was found that the length of unsmoked cigarette was an av. 1.28 mm shorter in those who inhaled than in those who did not inhale. Since the temperature of the smoke, and degree of irritation caused thereby, increases inversely with the length of the cigarette, a possible correlation with the development of lung cancer might be indicated. However, additional studies on the manner in which cigarettes are smoked by various individuals are necessary before any implications may be derived from these findings.

65-716 THE EFFECT OF DIETARY CASEIN ON THE INDUCTION OF LUNG TUMOURS BY THE INJECTION OF 9,10-DIMETHYL-1,2-BENZANTHRACENE (DMBA) INTO NEWBORN MICE. (E.) Walters, M. A. (Chester Beatty Res. Inst., London, S.W.3) and F. J. C. Roe. *Brit. J. Cancer* 18(2):312-316, 1964.

Pregnant BALB/c (Bittner agent free) mice were fed either a high casein diet (HCD; 25%) or a low casein diet (LCD; 15%) starting approx. 10 days before parturition. The newborn mice were then inj. s.c. within 24 hr. of birth with DMBA (30 µg in 0.02 ml of 3% aqueous gelatin) and placed on HCD or LCD. Survivors were sacrificed at 40 wk.; 100% of all DMBA-treated mice developed tumors, but the av. number of lung tumors per LCD survivor was 20.5 (26 mice) whereas per HCD survivor it was 30.8 (36 mice). It is concluded that DMBA

induces significantly ($P < 0.01$) more lung tumors in mice on HCD than on LCD. Other tumors observed were: in the HCD group, 3 malignant lymphomas and 1 hepatoma; in the LCD group, 3 hepatoma and 1 granulosa cell tumor of the ovary. In gelatin only and in untreated controls with HCD, av. number of lung tumors/survivor was 0.21 and 0.14, resp.; similar groups on LCD had 0.18 and 0.31, resp. No other malignancies were noted in the total of 146 surviving control mice.

65-717 NEW HETEROAROMATIC COMPOUNDS. XXI. SOME TETRACYCLIC SYSTEMS. (E.) Dewar M. J. S. (Dept. Chem., U. Texas, Austin) and W. Poesche. *J. Org. Chem.* 29(7):1757-1762, 1964.

Previously described procedures have been used to prepare several derivatives of 5,4-borazaropyrene of 9,10-dihydro-5,4-borazaropyrene and of 6,5-borazarochrysene. An improved synthesis of 4-amphenanthrene was developed. Attempts to synthesize a borazaro analog of benzo[c]phenanthrene were unsuccessful. This work represents a step towards the synthesis of corresponding analogs of such carcinogenic hydrocarbons as 3,4-benzpyrene.

65-718 INTRAMUSCULAR PRECANCEROUS LESIONS FROM HYDROCARBONS. (E.) Ikuta, F. (Lab. Div., Montefiore Hosp., New York, N. Y.) and H. Zimmerman. *Arch. Path. (Chicago)* 78(4):377-389, 1964.

Of ten 2-month-old female C3H mice implanted with crystalline powdered carcinogens into the lumbosacral or abdominal muscles (8 with 20-methylcholanthrene (MC); 2 with 3,4-benzpyrene), one mouse developed a local fibrosarcoma 3 mo. after the implantation of MC. The others formed reaction lesions but no malignancy. In the cytoplasm of the reactive cells of most of these precancerous lesions, cylindrical filamentous rods were observed with the electron microscope. Similar rods had been observed previously in precancerous, carcinogen-induced intracerebral lesions. These rods, which disappeared with tumor formation, resembled, but were not identical with, several viruses, and always occurred in groups near ingested crystals of the carcinogen. The rods, consisting of RNA and protein, probably developed from certain components of the reaction cells.

65-719 ON THE BINDING OF THE CARCINOGEN N-2-FLUORENYLACETAMIDE TO RAT SERUM ALBUMIN IN VIVO. (E.) Bahl, O. P. (VA Hosp., Minneapolis, Minn.) and H. R. Gutmann. *Biochim. Biophys. Acta* 90(2):391-393, 1964.

Adult male albino rats were inj. i.p. (3-5 mg in corn oil) with either of the labeled carcinogen metabolites [9-¹⁴C]N-2-fluorenylacetamide (9-F), [1-¹⁴C]N-(1-hydroxy-2-fluorenyl)acetamide (1-H)

[9-¹⁴C]N-hydroxy-2-fluorenylacetamide (9-H), their serum was analyzed electrophoretically. Radioactivity was associated exclusively with band V which had the same mobility as; and probably consisted of, protein(s) with a molecular weight and charge close to that of bovine serum albumin. The non-random distribution of radioactivity indicated binding of 9-F and 9-H (or analogs thereof) to rat serum albumin *in vivo*, suggested a covalent type of linkage. Electrophoresis of a mixture of bovine serum albumin and 9-F indicated no binding. Similarly, only 5% of the radioactivity applied to the gel was associated with the protein when bovine serum albumin and 9-H were electrophoresed under identical conditions. It is doubtful whether the small amounts of radioactivity detected on the rat serum albumin after admin. of 9-H were attributable to binding *in vivo*, since controls showed similar magnitude protein labeling. It is concluded that N-2-fluorenylacetamide and/or certain of its analogs are bound covalently to serum albumin *in vivo*.

720 GAS CHROMATOGRAPHIC DETERMINATION OF POLYNUCLEAR HYDROCARBONS IN DUST. (E.) Corti, A. (Inst. Anal. Chem., U. Naples, Italy), P. Cartoni and V. Cantuti. *J. Chromatogr.* 11(1):141-148, 1964.

A gas chromatographic method for separating polynuclear and paraffinic hydrocarbons is described. A technique is described for separation of these substances from dust samples. Among compounds surveyed are a number of carcinogens: benzo(a)pyrene, DMBA, DBA, MC and 1,12-benzoperylene. Results are compared with data obtained by spectrophotometry, and the advantages and limitations of both methods are discussed.

721 STUDIES OF NICKEL CARCINOGENESIS. FRACTIONATIONS OF NICKEL IN ULTRACENTRIFUGAL SUPERNATANTS OF LUNG AND LIVER BY MEANS OF DEXTRAN GEL CHROMATOGRAPHY. (E.) Sherman, F. W., Jr. (Dept. Med., Jefferson Medical Coll., Philadelphia, Pa.). *Am. J. Clin. Oncol.* 1(4):228-236, 1964.

A more detailed treatment of the paper abstracted in *CRA* 2(4):#700, 1964.

722 CHARACTERISTICS OF THE PRE-NEOPLASTIC STATE. (E.) Simpson, W. L. (Detroit Cancer Res., Mich.), B. Bond and Th. H. D. S. *Acta Un. Int. Cancr.* 20(3):700-705, 1964.

Intubation of 7,12-dimethylbenzanthracene (DMBA; 20 mg) in 40 female Sprague-Dawley rats for 7 wk. resulted in the development of mammary carcinomas or fibroadenomas in 36/36 animals which survived 28 days after treatment. Additional tumors developed at an av. rate of 1/rat/wk. The av. latent period was 39.3 days. The total

number of tumors observed was 174 (av. of 5.4 active tumor centers/rat): 142 adenocarcinomas (34 undifferentiated, 108 well-differentiated) and 32 well-differentiated fibroadenomas. Preneoplastic changes such as hyperplastic lesions of the ductal epithelium or periductal connective tissue and neoplastic changes were present in all stages in these animals. Diffuse epithelial hyperplasia with a marked increase of tissue mast cells was noted in non-tumorous glands. The increase in conc. of mast cells was correlated with the development of proliferative lesions of the ductal epithelium, but not with fibroplastic reactions. (See also *CRA* 1(2):#321, 1963.)

65-723 EFFECT OF CORTISONE ON THE FINE STRUCTURE, GLYCOGEN CONTENT, AND GLUCOSE-6-PHOSPHATASE ACTIVITY OF HEPATIC CELLS IN FASTED AND DIMETHYLNITROSAMINE-TREATED RATS. (E.) De Man, J. C. H. (Dept. Anat., Harvard Sch. Med., Boston, Mass.). *Cancer Res.* 24(8):1347-1361, 1964.

Fine structural liver cell morphology was studied in female rats (age 3-4 mo.). In rats fasted for 3 days, glycogen was distributed among the meshes of a well-developed smooth reticulum. Liver cells of fasted rats treated with cortisone (25 mg/day, i.m.) exhibited no mesh work in the glycogen areas; however, a few smooth vesicular structures were noted at the periphery of these areas. Single i.p. inj. of dimethylnitrosamine (DMN; 25-50 mg/kg) caused centrilobular necrosis and midzonal damage shown by fragmentation of cytoplasmic membranes and dissociation of the membranes and ribosomes; no glycogen was noted in most of the cells. Tolerance to DMN was lowered by adrenalectomy. DMN also caused a loss of centrilobular histochemical glucose-6-phosphatase activity but did not affect the activities of DPNH-diaphorase and succinic dehydrogenase. Some protection against the effect of DMN in adrenalectomized rats was afforded by cortisone. In fasted adrenalectomized rats admin. 10 mg/kg of DMN, cortisone brought about glycogen synthesis and prevented loss of centrilobular glucose-6-phosphatase activity with better preservation of the integrity of the cytoplasmic membrane system.

65-724 PATHOLOGICAL OBSERVATIONS ON MICE TREATED WITH PREPARATIONS ISOLATED FROM ASCITES TUMOUR CELLS AND ON MICE GRAFTED WITH LYMPHATIC CELL SUSPENSIONS FROM THE SO TREATED ANIMALS. (E.) Unger, E. (Frederic Joliot-Curie Nat. Res. Inst. Radiobiol. Radiohyg., Budapest, Hungary), P. Lónai, E. Hidvégi, F. Antoni and V. Várterész. *Neoplasma (Bratisl.)* 11(2):177-192, 1964.

Of 90 Swiss mice inoc. with DNA and deoxyribonucleoprotein isolated from Lettrec-Ehrlich ascites tumor cells, 13/32 histologically evaluated were found to have lymphoid leukemia (LL) and 1/32 thymus lymphosarcoma (TLY). Lymphatic cell suspensions from the treated mice were grafted into

250 mice half of which were given 300 r total-body irradiation prior to transplantation; of 56 histologically evaluated, 16 had LL, 15 myeloid leukemia (ML), 1 TLY and 1 reticulum cell sarcoma. Of 215 controls, 5 out of 121 histologically evaluated had LL and 3 TLY. All controls and only those animals (treated or grafted) whose autoptic picture or blood findings suggested leukemia were histologically processed. In general, the leukemic changes reached a max. incidence 140-170 days after initiation of the experiments. The histopathology and hematology of the leukemias and nonmalignant changes suggest that the reticular tissues respond simultaneously, but to varying degrees, to pathological stimuli. The nonmalignant histopathological changes are discussed with reference to their possible preleukemic character. (See also CRA 1(9-10):#1705, 1964.)

- 65-725 THE EFFECT OF SHORT-TERM FEEDING EXPERIMENTS WITH 3'-METHYL-4-DIMETHYL-AMINOAZOBENZENE ON RAT-LIVER MITOCHONDRIAL FUNCTION. (E.) Hawtrey, A. O. (Nat. Chem. Res. Lab., Pretoria, S. Africa), C. A. Schoeman, J. Dijkstra, V. Schirren and L. Nourse. Brit. J. Cancer 18(2):299-307, 1964.

Male albino rats (wt. 200-250 g) were fasted 4-6 hr., fed a single dose of 3'-methyl-4-dimethyl-aminoazobenzene (3'-MeDAB; 50 mg by stomach tube) and sacrificed at various intervals. Oxygen uptake by liver mitochondria with various citric acid cycle substrates was inhibited to various degrees up to 44 hr. after the carcinogen feeding. Thereafter, the isocitrate and citrate oxidation was affected to the greatest extent (66% and 50%, resp., at 90 hr.; 74% and 65%, resp., at 120 hr.; the oxidation of succinate, glutamate, malate and β -hydroxybutyrate was inhibited only 22.4%, 32.8%, 27% and 12.3%, resp., at 120 hr.). At 192 hr. after dye admin., the oxidation of all substrates was normal. Maximum dye binding did not correlate with the max. inhibition of citrate and isocitrate oxidation. The latter inhibitions were reversed by the addition of NAD + nicotinamide or by NAD + NADP + nicotinamide. The NAD-nucleosidase and NADP-nucleosidase activities of rat liver mitochondria were not affected by the 3'-MeDAB admin. However, the activity of ornithine transcarbamylase, an important enzyme in the urea cycle, decreased progressively (44% inhibition at 100 hr.) after 3'-MeDAB admin. No evidence of structural damage by 3'-MeDAB to the mitochondrial membrane was found.

- 65-726 MODIFICATION OF CELL ANTIGENS DURING AMINOAZO DYE CARCINOGENESIS IN RAT LIVER. (E.) Baldwin, R. W. (Cancer Res. Lab., U. Nottingham, England). Brit. J. Cancer 18(2):285-298, 1964.

A more detailed account is presented of the paper abstracted as CRA 2(6):#1082, 1964. It is concluded that loss of cell antigens in tumors is the result of neoplastic change rather than of

non-specific effects of carcinogen feeding. (See also CRA 1(4):#631, and ibid., (7):#1277, 1963.)

- 65-727 THE EFFECT OF ISOPROTERENOL ON DMBA CARCINOGENESIS IN RAT SUBMAXILLARY GLAND. (E., Abstract) Shklar, G. (Tufts U. Sch. Dent. Med., Boston, Mass.) and E. Cataldo. J. Dent. Res. 43(5)(Suppl. 2):893, 1964.

Ductal metaplasia and epidermoid cyst formation were evident in albino rats 6 wk. following implantation into the right submaxillary gland of pellets of 9,10-dimethyl-1,2-benzanthracene (DMB). Similar changes, along with glandular hyperplasia, were seen in DMBA + isoproterenol (IP; 20 mg/day i.p. for 2 wk.)-treated animals. At 10 and 14 wk numerous epidermoid carcinomas were noted in both groups. No effect on the rate of carcinogenesis was shown by IP. (See also CRA 2(1):#52; ibid., (4):#696; ibid., (8):#1486, 1964 and ibid., 3(1):#108, 1965.)

- 65-728 EFFECT OF SEX HORMONES ON ORAL CARCINOGENESIS. (E., Abstract) Weatherred, J. G. (U. Maryland Sch. Dent., Baltimore) and J. J. Salley. J. Dent. Res. 43(5)(Suppl. 2):893-894, 1964.

Estradiol benzoate (0.01% soln. painted on the abdomen 3x/wk.) was found to decrease the induction time of 9,10-dimethyl-1,2-benzanthracene (0.05% soln. painted 3x/wk. x 20 wk.)-induced carcinoma of the oral mucosa in Syrian hamsters of both sexes. Castration prolonged the induction time.

- 65-729 REVERSED SMOKING AND ITS ORAL CONSEQUENCES IN CARIBBEAN PEOPLES. (E., Abstract) Quigley, L. F., Jr. (Forsyth Dent. Ctr., Boston, Mass.), S. Schoenfeld and E. E. Hunt, Jr. J. Dent. Res. 43(5)(Suppl. 2):796-797, 1964.

The authors studied oral conditions in reversed smokers (smoking with the lighted end of a cigarette in the mouth) by means of oral biopsies, smears, and periodontal examinations. Heavy black tar deposits, leather-like tissues, heavy leukoplakia on the lips, scarring of the tongue, and reduced salivary flow were seen, along with frequent exceptionally healthy gingivae.

- 65-730 HAZARDS OF GROUNDNUTS. (E.) Latham, M. C. (Harvard U. Sch. Public Health, Boston, Mass.). Brit. Med. J. 2:819-820, 1964.

The author stresses the need to extend to man the researches thus far restricted to animals dealing with the nutritional hazard of liver cancer resulting from feeding peanut (groundnut) meal contaminated with aflatoxin from Aspergillus flavus.

graphic studies are needed of areas of high nut consumption in human nutrition, of areas of h incidence of liver carcinoma and liver rosis, and of possible secretion of aflatoxin breast milk.

- 731 CHROMOSOMAL CHARACTERISTICS OF THREE TRANSPLANTABLE LEUKEMIAS OF RATS. (E.) idzhyan, V. S. (Inst. Exp. Clin. Oncol., USSR Med. Sci., Moscow) and E. E. Pogoyants. Proc. (Transl. Suppl.) 23(5)(Pt. 2): 8-T1020, 1964.

This article is the English version of a Russian article appearing in Vop. Onkol. 9(12):47-, 1963. See CRA 2(3):#452, 1964.

- 732 MALIGNANT GLIOMA INDUCED IN RABBITS BY METHYLCHOLANTHRENE. (E.) Yablonovskaya, A. (Burdenko Inst. Neurosurg., USSR Acad. Sci., Moscow) and A. P. Avtsyn. Fed. Proc. (Transl. Suppl.) 23(5)(Pt. 2):T1047-T1050, 1964.

This article is an English version of a Russian article published in Ark. Pat. 25(10):28-, 1963. Four female chinchilla rabbits (620-900 g) which were implanted intracerebrally with crystalline methylcholanthrene (9 mg), 3 developed symptoms of cerebral lesion, and upon sacrifice, various foci of glial proliferation and hydrocephalus were noted in 2/3. The third animal, sacrificed 4 yr. after treatment, showed a large cerebral tumor which upon histologic examination was found to be a malignant glioma having various histological features described as ependymoma, angioreticuloma, dedifferentiated pro-mesenchymal astrocytoma, oligodendroglioma and poly-morphic glioma with giant nuclei. This tumor was successfully transplanted into the brains of 6/8 previously X-irradiated and cortisone-conditioned chinchilla rabbits of the same sex. In a study of transplantability, subsequent passages showed a tumor transplantability of 50-65%. In addition, the tumor had been passed through 9 generations, and showed a decrease in the diversity of its histological structure with each passage. Generally, the 2 types preserved were the ependymoma and dedifferentiated protoplasmic astrocytoma.

- 733 THE CARCINOGENICITY OF NITROSOANABASINE, A POSSIBLE CONSTITUENT OF TOBACCO (E.) Boyland, E. (Chester Beatty Res. Lab., London, S.W.3), F. J. C. Roe, J. W. Gorrod and C. V. Mitchley. Brit. J. Cancer 18(2): 170, 1964.

Four rats of Chester Beatty strain (16 males and 16 females/group) received nitrosoanabasine (NA) or nitrospiperidine (NP), 0.2% in drinking water (total dose 5 mg/day x 6 days per wk.), or nitromethylaniline (NM), 0.2% for 7 mo., then approx. 5 mg, then 2.5 mg/day x 6 per wk.).

NP induced esophageal (16/26 malignant), and liver tumors (10/23 malignant), with all animals dying by day 266. NM induced 30 esophageal (but no hepatic) tumors (20/30 malignant) which arose relatively late (the first was found on day 213). Among 27 rats killed between days 347-521 of NA treatment, 25 had multiple esophageal tumors, and 5/25 were malignant. One malignant lymphoma in the NM group and 1 mammary adenocarcinoma in the NA group were considered spontaneous, since such tumors occur in controls; 1 salivary gland adenocarcinoma in a female of the NM group, however, may have been induced, since such tumors rarely arise spontaneously. Among 10 malignant liver tumors in the NP group, 4 had metastasized to the lungs. In all 3 groups, the malignant esophageal tumors were squamous cell carcinomas. Except for an invasion of the thyroid in a male rat treated with NM, distant metastases were not observed, probably because these tumors interfered relatively early with the nutrition of the animals. It was concluded that NA is definitely carcinogenic, although slower in action than NP or NM. All attempts to detect NA or nitrosonornicotine in tobacco smoke have so far been unsuccessful. Other constituents of the smoke appear to interfere with the reactions, since even when NA is injected into cigarettes before smoking or to the smoke condensate, none can be detected by the current methods.

- 65-734 VARIATIONS IN THE RATE OF INDUCTION OF CHEMICAL CARCINOGENESIS ACCORDING TO DIFFERING PSYCHOLOGICAL STATES IN RATS. (E.) Anderson, M. R. (Algernon Firth Inst. Path., Leeds, England). Nature (London) 204:55-56, 1964.

Four groups of 12 Sheffield strain male and female Wistar rats were inoculated s.c. with 20-methylcholanthrene (0.05 g). Each group was then maintained in a different environmental condition as follows: group A (contented) was stroked daily; group B (stressed) received daily inj. of epinephrine; group C (alerted) was kept in tension cages which were lit for 5 min. preceding an electric shock delivered to the floor of the cage once every hr.; group D (controls) received no further treatment. After 40 wk., the number of female and male rats, resp., without tumors in each group was: (A) 0/6 and 0/6; (B) 2/5 and 0/6; (C) 3/6 and 1/6; (D) 0/6 and 0/6. It is believed that the rate of tumor induction by chemical carcinogenesis in rats can be varied by modifying the environment, and hence the psychological state.

- 65-735 APPEARANCE OF DISTANT TUMORS IN DOGS INJECTED INTRAOSSEOUSLY WITH CHEMICAL CARCINOGENS. (E.) Krotkina, N. A. (Inst. Oncol., USSR Acad. Med. Sci., Leningrad) and M. A. Achkasova. Fed. Proc. (Transl. Suppl.) 23(5)(Pt. 2):T1033-T1036, 1964.

This article is the English version of a Russian article appearing in Vop. Onkol. 9(7):15-, 1963. See CRA 1(6):#1046, 1963.

- 65-736 A COMPARATIVE STUDY OF ORAL EXFOLIATIVE CYTOLOGY AND HISTOPATHOLOGY DURING INDUCED CARCINOGENESIS IN THE HAMSTER CHEEK POUCH. (E., Abstract) Randall, W. C. (U. Minnesota, Minneapolis), L. H. Meskin and B. L. Shapiro. *J. Dent. Res.* 43(5)(Suppl. 2):797, 1964.

Topical application of 5,6-dimethyl-1,2-benzanthracene, 3x/wk. for 15 wk., to the cheek pouches of 42 adult Syrian hamsters produced inflammation, degeneration, regeneration, and hyperplasia as early histopathologic changes. Benign papillomas were first seen during wk. 8. Squamous cell carcinoma was present in all animals during wk. 12. Exfoliative cytology did not permit reliable diagnosis regarding the inflammatory, benign, and malignant neoplastic stage of the lesions. (See also the following abstract.)

- 65-737 RADIOGRAPHIC LOCALIZATION OF LABELED CARCINOGEN. CARBON 14 LABELED DIMETHYLBENZANTHRACENE IN THE HAMSTER CHEEK POUCH. (E.) Meskin, L. H. (Dept. Oral Path., U. Minnesota Sch. Dent., Minneapolis) and B. F. Woolfrey. *Arch. Path. (Chicago)* 78(6):643-647, 1964.

Historadioautographic localization studies were performed on 52 Golden Syrian male hamsters (aged 6 wk.) at 15 min. to 144 hr. after single or multiple applications of 9,10-dimethyl-1,2-benzanthracene (DMBA) to their left cheek pouches and labeled (C^{14}) DMBA to their right cheek pouches. Rapid absorption of labeled DMBA through the intact pouch epithelium occurred immediately after application. Surface and epithelial radioactivity decreased progressively over a period of 24 hr., while submucosal radioactivity remained higher and decreased more slowly and generally declined to background by 48 hr. Repeated applications at 48, 96 and 144 hr. produced a progressive increase in mononuclear inflammatory cells, dilatation of vessels and edema appearing predominantly in zones of increased radioactivity. Eight hr. after the third and fourth applications (96 and 144 hr.) vacuolar degeneration of the basal epithelium was followed by minute surface ulceration overlaid with an exudate consisting of polymorphonuclear leukocytes. Extensive polymorphonuclear leukocytic infiltration of the underlying mucosa then occurred and bore no relationship to radioactive foci. (See also the preceding abstract.)

- 65-738 CARCINOGENIC ACTION OF DIETHYLNITROSAMINE IN A DOG. (Ger.) Schmähl, D. (Inst. Path., U. Bonn, Germany), C. Thomas and G. Scheld. *Naturwissenschaften* 51(19):466-467, 1964.

A 23 kg female dog that received diethylnitrosamine (DENA), 508 mg/kg p.o. and s.c. and required a portacaval anastomosis due to a

progressive hepatic cirrhosis, showed no tumor at surgery. Two mo. after surgery, DENA was resumed at 3 mg/kg p.o. every 7 days to a total of 57 mg/kg (total dose 565 mg/kg in approx. 2 yr.). The dog died of cachexia, and the autopsy showed marked tumor formation in the region of the liver. A leiomyosarcoma and marked cirrhosis were found in the liver. Metastases of the leiomyosarcoma were found only in the regional lymph nodes. In contrast to previously reported effects of DENA in rat and mouse, the cirrhotic effect was very prominent in the dog.

- 65-739 THE INTERACTION OF NUCLEIC ACIDS WITH 4-DIMETHYL-AMINOAZOBENZENE AND 4-AMINOAZOBENZENE. (E.) Tung, Ta-Cheng (Dept. Biochem. Nat. Taiwan U. Coll. Med., Taipei, Republ. of China) and Jen-Kun Lin. *J. Formosa Med. Assn.* 63(4):189-196, 1964.

Calf thymus DNA increased greatly the solubility of 4-dimethylaminoazobenzene (DAB); 4-aminoazobenzene (AAB) was much less active in this respect. Sodium chloride markedly decreased the binding of DAB to DNA. Yeast RNA was less active in the solubilization of DAB; sodium chloride enhanced the binding of DAB to RNA. Heat treatment enhanced slightly the effect of DNA, and greatly increased that of RNA. DAB actively quenched the fluorescence of DNA and RNA; AAB did so less actively. Thus, solubility and fluorescence-quenching studies show that DAB is bound to nucleic acids in solution; AAB binds nucleic acids less actively. Various mechanisms of binding are discussed.

- 65-740 THE INTERACTION OF RIBOFLAVIN WITH 4-DIMETHYLAMINOAZOBENZENE AND 4-AMINOAZOBENZENE. (E.) Tung, Ta-Cheng (Dept. Biochem. Nat. Taiwan U., Taipei, Republ. of China) and Jen-Kun Lin. *J. Formosa Med. Assn.* 63(5):225-226, 1964.

Both the direct spectrophotometric and fluorometric methods demonstrated the formation of complexes between riboflavin (in aqueous solution) and 4-dimethylaminoazobenzene (DAB) and 4-aminoazobenzene (AAB). AAB was more active than DAB in complex formation. Riboflavin was found to be the most effective solubilizing agent for DAB, as compared with adenine, guanine, thymine, cytosine, uracil, adenosine, and adenylic acid. The direct physicochemical interaction (complex formation) of riboflavin with DAB might, in part, constitute the mechanism of action whereby the vitamin can prevent hepatoma induction by DAB.

- 65-741 THE FINE STRUCTURE OF THYROID TUMOURS INDUCED BY LOW IODINE DIET IN RATS. Lupulescu, A. (Inst. Endocr., Bucharest, Rumania) and A. Petrovici. *Acta Anat. (Basel)* 57(4):294-305, 1964.

Studies with the light and electron microscope

thyroid tumors (alveolar adenomas) induced by a low iodine diet for 14 mo. in 10 male Wistar rats (180-220 g) revealed changes occurring at the level of endoplasmic reticulum which consisted of marked dilation of the ergastoplasmic vesicles with lumina containing a fine granular-like substance. Secretory droplets increased in size and number and migrated toward the basal pole. Changes in the ultrastructure also occurred at the level of the mitochondria and Golgi apparatus, but to a lesser degree. (See also CRA 2(4):#639, 1964.)

742 ELECTRON MICROSCOPY OF THYROID TUMORS INDUCED BY LOW IODINE DIET IN RATS. (Abstract) Lupulescu, A. and A. Petrovici. Stud. Endocr. 14(4-5-6):643-649, 1963.

CRA 3(4):#741, 1965.

743 ENDOCRINE ENVIRONMENTS IN EXPERIMENTAL PROSTATIC TUMORS AND ADENOMAS. (Abstract) Takenaka, I. (Dept. Urol., Hiroshima U. Sch. Med., Japan), T. Ishibe and K. Kato. Nippon Naibunpi Gakkai Zasshi (Folia Pharmacol. Jap.) 40(2):151, 1964.

A total of 90 Wistar rats, inj. of 20-methylcholanthrene into the anterior lobe of the prostate induced, about 6 mo. later, various tumors (approx. 70% adenocarcinoma, squamous cell carcinoma, and sarcoma). In a study of the influence of the hormonal environment on the development of these tumors, admin. of estrogen caused a rise to tumors at 70 days; castration, at 110 days; and androgen and gonadotropin, at 110 days. The highest rate of tumor induction (90%) was achieved with estrogen; the other procedures did not significantly modify the rates of tumor induction.

744 STUDIES OF NICOTINE METABOLISM (A SUBSEQUENT REPORT). THE ACCELERATION OF THE METABOLISM OF NICOTINE IN 3-METHYLCHOLANTHRENE- OR 2-ACETYLAMINOFLUORENE-TREATED RATS. (Abstract) Nagai, K. (Dept. Pharm., Osaka U. Sch. Med., Japan) and T. Yamamoto. Nippon Yakurigaku Zasshi (Folia Pharm. Jap.) 60(2):61, 1964.

The influence of carcinogenic agents on the metabolism of nicotine was studied by comparing the metabolic rate of nicotine with that of 2-acetylaminofluorene (2-AAF). Administration of methylcholanthrene, 20 mg/kg, i.p. to rats 24 hr. later caused up to a 10-fold rise in 2-AAF metabolism; nicotine metabolism was increased only 1.5 x. Feeding rats a 0.025% 2-AAF diet for 3 weeks caused rises in the metabolism of both 2-AAF and nicotine (up to 1.5 x). Administration of benzo(a)pyrene, 25 mg/kg, i.p., caused 24 hr. later a rise in the 2-AAF metabolism of up to 10 x and some rise in the nicotine metabolism.

65-745 INDUCTION OF URINARY BLADDER NEOPLASMS IN EXPERIMENTAL ANIMALS. (Pol.)

Wojewski, A. (Clin. Urol., Pomorze Acad. Med., Szczecin, Poland), A. Łaska and R. Roessler. Roczn. Pom. Akad. Med. Swierczewski 10:549-556, 1964.

Methylcholanthrene, introduced as a paraffin pellet into the urinary bladder (10 rats and 10 rabbits) and also into a surgically created diverticulum of the bladder (10 rats and 10 rabbits), was admin. at 10 mg/rat (albino males and females, wt. 150-250 g, 5-7 mo. old) and at 20 mg/rabbit (non-selected, 4-5 mo. old). The animals were observed for 12 mo. Multiple papillomas, usually sessile, developed in the bladder of 4 rats, epithelial hyperplasia in 3 rats; in the diverticulum there developed 4 papillomas and 4 sarcomas. Thirty transplantation trials of the sarcomas were unsuccessful. No tumors and only 1 case of hyperplasia were found among 20 control rats. A very early papillomatous phase within the bladder was found in 3 rabbits; no other neoplastic changes were seen.

65-746 EFFECT ON TUMOUR GROWTH IN SYNGENEIC RECIPIENTS OF ANTIBODIES AGAINST TUMOUR-SPECIFIC ANTIGENS IN METHYLCHOLANTHRENE-INDUCED MOUSE SARCOMAS. (E.) Möller, G. (Dept. Tumor Biol., Karolinska Inst. Sch. Med., Stockholm, Sweden). Nature (London) 204:846-847, 1964.

Trypsinized methylcholanthrene-induced (M-1) tumor cells of recent origin (7th-20th transfer generation) were inoc. s.c. into syngeneic recipients for 3 consecutive times. In order to induce enhancement of the tumors, 0.1 ml of serum against tumor-specific antigens was inj. i.p. 30 min. before the tumor inoc. and then every 3-4 days until palpable tumors developed. Care was taken to avoid immune reactions against sex-determined antigens. Some mice were treated with antiserum prepared in C57BL/10 mice against another, non-cross-reacting M-1 sarcoma (MBA) of C57BL/10 origin. The M-1 sarcoma (MALA) of (A x C57L)F₁ hybrid female origin was inoc. s.c. into 2 groups of (A x C57L)F₁ females. One group (controls) with MALA tumor received the unrelated anti-MBA serum, while the experimental group received (A x C57L)F₁ anti-MALA serum. Both sera were inj. at 0.1 ml x 14 within 44 days. All recipients treated with specific anti-serum developed progressively growing tumors, while 2/4 controls were free of palpable tumors. The other 2 controls developed sarcomas but with longer latent periods and with slower growth. It was concluded that specific antiserum considerably facilitated tumor growth in the strain of origin. Tumor-specific serum from (A x DBA/2)F₁ hybrids (6-9 inj. at 3-4-day intervals) was admin. to experimental animals inoc. s.c. with 10⁵ cells of M-1 sarcoma MDAY of (A x DBA/2)F₁ origin. Controls inoc. with MDAY received 9 inj. of

anti-MBA serum or remained untreated. All specific-antiserum treated mice showed shorter latent period and faster tumor growth than the controls. However, repeated inj. of anti-MC57G serum into (A x C57BL)F₁ hosts inoc. s.c. with MC57G sarcoma cells of C57BL origin resulted in definite inhibition of this M-1 tumor. These results suggest that humoral antibodies against tumor-specific antigens in M-1 mouse sarcomas do exist and can be demonstrated by their capacity to enhance or inhibit tumor growth in syngeneic recipients. The indirect fluorescent antibody technique performed *in vitro* on living tumor cells gave positive staining reactions with MALA sarcoma cells treated with specific antiserum prepared in syngeneic hosts, but MDAY and MC57G cells gave negative reactions.

- 65-747 POSSIBILITIES OF DIAPLACENTAL CARCINOGENIC ACTION OF DIETHYLNITROSAMINE IN GOLDEN HAMSTER. (Ger.) Mohr, U. (1st Clin. Gynec., U. Munich, Germany) and J. Althoff. Naturwissenschaften 51(21):515, 1964.

Diethylnitrosamine was admin. s.c., total 2-14 mg (2 mg/day), to Golden hamsters during the second half of pregnancy. The first young were killed at 8-16 wk. after birth. Metaplasias and papillomas were found predominantly in the region of the trachea (13/45 and 5/45, resp.). Hepatic degenerative changes were noted. Pulmonary changes were seen in 14/45. It must yet be clarified whether the carcinogenic effect is diaplacental or attributable to the mother's milk.

- 65-748 NEOPLASMS OF THE LIVER AND URINARY BLADDER IN RATS FED 2-ACETYLAMINO-FLUORENE AND INDOLE: THE EFFECT OF PREVIOUS INJECTIONS OF CARBON TETRACHLORIDE ON THE NEOPLASMS. (E.) Oyasu, R. (Kyoto Nat. Hosp., Japan), J. H. McDonald and G. M. Hass. Presbyt. St. Luke Hosp. Med. Bull. 3(4):162-167, 1964.

See CRA 1(9-10):#1724, 1964. (See also CRA 1(1):#69, 1963.)

- 65-749 RIBONUCLEASE AND DEOXYRIBONUCLEASE ACTIVITIES IN RAT AND MOUSE STRATIFIED SQUAMOUS EPITHELIA AND SKIN PAPILOMAS. (E.) Daoust, R. (Res. Lab., Montreal Cancer Inst., Canada) and H. Amano. J. Histochem. Cytochem. 12(6):429-437, 1964.

Skin papillomas were produced by applying to the dorsum of mice 0.05 ml of a 0.5% soln. of 9,10-dimethyl-1,2-benzanthracene in benzene. The distribution of RNA and DNA activities of skin papillomas in mice and of various stratified squamous tissues of mice and adult albino rats was examined by substrate film methods. In the various types of stratified squamous epithelia, nuclease activity was localized in perinuclear zones in cells of the Malpighian layer. Activity

in these sites increased from the lower to the upper layers and a strong band reaction corresponded to the limit between the non-keratinized and keratinized cell layers.

- 65-750 EPITHELIAL PAPILOMAS OF THE NASAL CAVITY. EXPERIMENTAL INDUCTION IN SYRIAN HAMSTERS. (E.) Herrold, K. McD. (NCI, Bethesda). Arch. Path. 78(3):189-195, 1964.

Diethylnitrosamine was admin. to 3 groups of weanling Syrian hamsters: Group 1, i.p., 2 mg 1x/wk. x 4-7 mo.; Group 2, intradermally, 3.5 mg 1x/wk. for 5-6 mo.; Group 3, undiluted topically to shaved area of interscapular region 1x/wk. for 1 yr. Epithelial papillomas of the nasal cavity occurred in 5/15, 10/19 and 6/8, resp. The site of origin was from the respiratory epithelium lining the naso- and maxillo-turbinates. Squamous metaplasia accompanied the tumors. Small papillary lesions and focal areas of metaplasia occasionally involved the nasal septum and nasolacrimal duct. Most tumors were single and unilateral, but 2 animals had multiple tumors. (For related studies see CRA 1(5):#884, 1963; *ibid.*, 3(1):#52, 1965; and the following abstract.)

- 65-751 COMPARATIVE CARCINOGENIC EFFECTS OF DIETHYLNITROSAMINE BY DIFFERENT ROUTES OF ADMINISTRATION TO SYRIAN HAMSTERS. (E., Abstract) Herrold, K. McD. (NCI, Bethesda). Proc. Am. Assn. Cancer Res. 5(1):26, 1964.

In Syrian hamsters to which diethylnitrosamine was admin. by i.p., intradermal and topical routes for 4-7 mo., fewer hepatocellular carcinomas were induced as compared to the s.c. route. The greatest carcinogenic effect was seen in the trachea, bronchi and nasal cavity, which suggests that the respiratory system is a major pathway of excretion. (See also CRA 1(5):#884; *ibid.*, (6):#1072, 1963; *ibid.*, 3(1):#52, 1965; and the preceding abstract.)

- 65-752 TOXIC AND CARCINOGENIC ACTION OF DIETHYLNITROSAMINE IN RATS DURING SIMULTANEOUS TREATMENT WITH A LIVER-PROTECTIVE SUBSTANCE. (Ger.) Schmähl, D. (Inst. Path., U. Bonn, Germany), C. Thomas and G. Scheld. Arzneimittelforschung 14(10):1167-1168, 1964.

After a single p.o. LD₅₀ dose of diethylnitrosamine (DENA) of 220 mg/kg, 16/30 rats (albino, both sexes) died, usually on day 3-6. Necrotic and sometimes also hemorrhagic liver was found at autopsy. Smaller pulmonary hemorrhages also occurred frequently. Admin. of a liver-protective agent, Prohepar (liver hydrolysate plus essential amino acids), 10 mg/kg x 10 p.o. (first admin. 1 hr. after DENA), or a single dose, 5 ml/kg i.p. 2 hr. before admin. of DENA, did not decrease the toxicity of the latter. At 3 mg/kg/day of DENA plus simultaneous admin. of Prohepar, 10 ml/kg/day, all 20 rats developed hepatocellular carcinoma

av. total DENA dose of 723 ± 98 mg/kg; in rats treated with DENA alone, the av. total required for tumorigenesis was 700 ± 72 mg/kg. It was concluded that the toxic and carcinogenic effects of DENA are not affected by Prohepar.

53 A STUDY OF CARCINOGENIC POTENTIAL OF A DERMATOLOGIC AGENT. (Jap., Abstract) Kimura, K., T. Hirohata, and K. Kuratsune. Nara Igaku Zasshi (Jap. J. Hyg.) 19(2): 18, 1964.

Commercially-sold dermatologic agent (M), chemical analysis of which showed that it contained acene, pyrene, fluoranthene, chrysene, anthracene, benzo(a)pyrene (0.186 mg/50 g), perylene, benzo(ghi)perylene, anthanthrene, coronene, was topically applied to the skin of 9-week-old CF#1 mice in the amount of approx. 0.05 g/wk. in 3 divided applications for total 15 wk. At 15 wk., the first tumor appeared and by the end of 34 wk. all the 38 surviving mice had developed tumors. In 30/38 studied histologically, there were included 40 papillomas, 9 skin squamous carcinomas and 4 anterior gastric papillomas.

THIN-LAYER CHROMATOGRAPHY OF 4-DIMETHYLAMINOAZOBENZENE AND SOME OF ITS METABOLITES. (E.) Topham, J. C. (Cancer Res. Unit, Addenbrooke's Hospital, Cambridge, England) and J. W. Westrop. J. Chromatogr. 16(1):233-234, 1964.

Following dyes were readily separated and identified when present in a mixture in the range 0.001-0.025 μ g: 4-dimethylaminoazobenzene, dimethylaminoazobenzene, 4-aminoazobenzene, and their 4'-hydroxy derivatives.

METABOLISM OF POLYCYCLIC COMPOUNDS. 26. THE HYDROXYLATION OF SOME AROMATIC HYDROCARBONS BY THE ASCORBIC ACID MODEL HYDROXYLATING SYSTEM AND BY RAT-LIVER MICROSOMES. (E.) D. E. (Chester Beatty Res. Inst., London), M. Kimura and P. Sims. Biochem. J. 103:631-638, 1964.

Effects of chemical hydroxylation (ascorbic acid-dependent, Fe^{2+} ion system), of hydroxylations by rat-liver microsomes, and products excreted as urinary metabolites by animals treated with the hydrocarbons (HC) are tabulated for naphthalene, anthracene, phenanthrene, pyrene, and 1,2-benzanthracene. Both the chemical and the enzymic reactions were similar with the simpler HC; however, the more complex HC showed less reaction at the benzylic bonds of the molecules with the chemical than with the enzymic reactions. Although some of the same products with both systems, there were marked differences.

EFFECTS OF VARIOUS PHYSICO-CHEMICAL CARCINOGENIC PROCEDURES INTRODUCED DURING

NEWBORN PERIOD IN MICE. (Jap., Abstract) Kimura, K. (Dept. Path., Nara Coll. Med., Japan) and Y. Senra. Nara Igaku Zasshi (J. Nara Prefect. Med. Assn.) 15(2-3):231, 1964.

In experimental carcinogenic studies, local inj. of methylcholanthrene (0.1 mg) induced after 4, 8 and 12 wk. 30%, 84% and 100%, resp., transplantable lung adenomas in A strain newborn mice, as compared with 33% at 12 wk. in ddj newborn mice and with 28% at 8 wk. in A strain adult mice. The incidence of sarcoma at the inj. site was higher in ddj strain newborn mice than in A strain newborn mice. Administration of 4-nitroquinoline, 0.05 mg, to A strain newborn mice, induced lung adenoma in 94% of the animals at 12 wk. but no local sarcoma during a 40-wk. observation period. Exposure of A strain newborn mice to X-ray radiation, 100 r (single dose), failed to induce tumor during a 12-wk. observation period.

65-757 CARCINOGENICITY OF 2-NAPHTHYLAMINE, 2-NAPHTHYLHYDROXYLAMINE AND 2-ACETYLAMINOFLUORENE IN NEWBORN MICE. (E., Abstract) Roe, F. J. C. and B. C. V. Mitchley. P. 60 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

In a further study of CRA 1(8):#1530, 1963, newborn mice were given a single inj. (100 μ g) or 5 daily inj. (100 μ g/day) of 2-naphthylhydroxylamine in arachis oil and the incidence of lung tumors at 40 wk. was approx. 3x that of controls given only arachis oil; there was no difference in incidence after 100 μ g or 500 μ g. A similar experiment with 2-naphthylamine gave a completely negative result. A single inj. of 2-acetylaminofluorene (AAF; 100 μ g) in arachis oil on day 1 of life did not increase lung tumor incidence at 40 wk., whereas AAF given on the first 5 days of life (100 μ g/day) increased the lung tumor incidence 4x that of the controls.

65-758 KIDNEY TUMOURS IN RATS FOLLOWING TREATMENT WITH 2-ACETAMINOFLUORENE, TRYPTOPHAN AND 1 \rightarrow 4-SACCHAROLACTONE AND THE FAILURE OF SUBSTANCES WHICH CAUSE PORPHYRINURIA TO INDUCE TUMOURS. (E., Abstract) Boyland, E., C. E. Dukes, P. L. Grover and B. C. V. Mitchley. Pp. 58-59 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

In rats treated with 2-acetylaminofluorene (2-AAF) and tryptophan, very few bladder tumors occurred as compared to a previous study by the senior author in which a high incidence of bladder tumors was produced. However, tumors of the kidney were induced in female rats treated with 2-AAF, saccharolactone and either tryptophan or indole; male rats developed tumors of the liver but not of the kidney. None of the following compounds had proven to be carcinogenic when fed to rats: mercuric

acetate, hexachlorobenzene, barbituric acid, acetylphenylhydrazine, a collidine derivative (1,4-dihydro-4,6-trimethylpyridine-3,5-dicarboxylate) and allylisopropyl acetamide.

- 65-759 INDUCTION OF BLADDER TUMOURS IN MICE. (E., Abstract) Boyland, E., E. R. Busby, C. E. Dukes, P. L. Grover and D. Manson. Pp. 59 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

Statistically significant incidences of bladder tumors in mice were obtained with 4-acetamido-2'-hydroxy-6'-methylazobenzene (celliton yellow), 2-acetamidonaphthalene, bis(2-amino-1-naphthyl)-phosphate and 2-naphthylhydroxylamine (2-NHA) when cholesterol was the vehicle for the pellet implantation. The results indicate that cancer of the bladder induced with 2-naphthylamine could be due to the direct local action of an o-amino-phenol-2-amino-1-naphthol released by enzymic hydrolysis of the bis phosphate or by the arylhydroxylamine, 2-NHA. (See also CRA 1(5): #826, 1963.)

- 65-760 CARCINOGENESIS IN THE GENITAL TRACT OF RATS. (E.) Glucksmann, A. and C. P. Cherry. Pp. 387-389 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

Repeated doses of pelvic (6 x 400 r in 20 wk.) or whole-body X-irradiation (5 x 400 r in 16 wk.) increased significantly the yield of cervico-vaginal sarcomas and shortened the induction period in oophorectomized (oox.) rats treated 1x/wk. with 9,10-dimethyl-1,2-benzanthracene (DMBA), while the same radiation treatment given to intact rats treated similarly with DMBA reduced the incidence of sarcomas and prolonged the induction period. In another study, DMBA painting of the cervix and vagina of intact rats induced about 80% sarcomas but only 5% papillomas and 2% carcinomas, while in oox. rats the incidence of sarcomas and epithelial tumors was 20% and 0%, resp. Additional treatment with methylthiouracil increased the incidence of vaginal papillomas in oox. and intact rats to about 30% and of carcinomas to 14%. In intact animals, cortisone (C) increased the incidence of papillomas to about 12%, while treatment with estrogen, progesterone, thyroxine (T) or x-rays failed to enhance the incidence of epithelial tumors. In oox. rats, T, C and X-rays stimulated the formation of epithelial neoplasms, especially papillomas, while X-rays stimulated the incidence of both equally. Rhabdomyomas near the cervico-vaginal junction were induced in rats treated with insulin + DMBA painting 1x/wk. In a study of the effect of DMBA plus various hormones, no correlation was seen between the activity of the thymus itself or of its

epithelial components and the induction of tumor in either the genital tract or salivary glands of female rats. It is also impossible to correlate the differences in the histology of the pituitary with the tumor yield. (For effects in mice, see CRA 1(4):#628, 1963.)

- 65-761 ORAL CONTRACEPTIVES AND BREAST CANCER. (E.) Shipman, J. J. (Lister Hosp., Hitchin, Hertfordshire, England). Brit. Med. J. 2:629, 1964.

In a letter to the author, A. E. J. Mullins described a young lady with a rapidly growing carcinoma of the breast who was taking unspecified oral contraceptives. The author reports a 34-year-old woman with a small carcinoma who was taking unspecified oral contraceptives.

- 65-762 LIVER CHANGES CAUSED BY CARCINOLIPIN. (E.) Friborský, V. (Inst. Oncol., Prague, Czech.). Neoplasma (Bratisl.) 11(1): 55-61, 1964.

Of 242 animals given carcinolipin (C; dose not stated), liver changes occurred in 9 of strain A 3 of strain CBA and 10 of strain C57. According to mode of admin. of C, liver cell changes occurred in 4/21 animals (19%) inj. i.p.; 8/61 (13%) given single s.c. inj.; 3/50 (6%) given repeated s.c. inj.; 5/42 (12%) treated parenterally; and 2/68 in which it was applied topically. C caused a disturbance of liver cell metabolism, manifested by hydropic degeneration, focal steatosis, glycogen depletion, the presence of vacuoles in the nuclei and changes in nuclear size. It is suggested that C induces an intensification of metabolism which is followed by exhaustion of the liver cells.

- 65-763 LEUKAEMIA AND PHENYLBUTAZONE. (E.) Chatterjea, J. B. (Calcutta Sch. Trop. Med., India). Brit. Med. J. 2:875, 1964.

The author reports a case of acute myeloid leukemia in a 46-year-old man who had taken phenylbutazone intermittently for a "significant" period before the onset of leukemia.

- 65-764 CIGARETTE SMOKE: CHARCOAL FILTERS REDUCE COMPONENTS THAT INHIBIT GROWTH OF CULTURED HUMAN CELLS. (E.) Thayer, P. S. (Life Sci. Div., Arthur D. Little, Inc., Cambridge, Mass.) and C. J. Kensler. Science 146:642-644, 1964.

Three types of 85 mm cigarettes were used to evaluate the cytotoxicity of cigarette smoke and the effects of a charcoal filter on it: type A (3-p filter, 2 sections of cellulose acetate on either side of charcoal granule compartment); type B (same as A except for empty center); type C (no filter, otherwise same as A and B). Each type of

igarette was tested for inhibition of growth and protein synthesis of KB cells. Cellulose acetate filters reduced cytotoxicity of the particulate matter in proportion to the wt. of particles removed. The appropriately designed filters with activated charcoal granules selectively reduced cytotoxic components in the smoke of both phases, although the reduction was greater in the gas phase.

765 THE EFFECT OF VARIOUS HORMONES, ISOTOPES, AND ISOTOPE-TAGGED HORMONES ON INDUCED BLAST CANCER IN THE RAT. (E., Abstract) Richter, W. S. (Dept. Surg., U. Oregon Sch. Med., Portland), E. D. McSweeney, Jr. and J. E. Dunphy. *J.M.A.* 188(5):439, 1964.

Sprague-Dawley rats bearing breast tumors induced by a single feeding of 9,10-dimethyl-1,2-benzanthracene, the admin. of diethylstilbestrol temporarily diminished the number and size of tumors, while norethynodrel (N) or the association of 17 α -ethynyl estradiol 3-methyl ether ("Enovid") accelerated both the development and growth of tumors. Controls receiving sodium radiophosphate alone continued the rapid development and growth of tumors.

766 MAMMARY CANCERS AFTER ESTROGEN THERAPY. MYTH OR REALITY? (Fr.) Fauvet, J. Gave-Roussy Inst., Villejuif/Seine, France) P. Juret. *Rev. Prat.* 14(17):2209-2217, 1964.

Review of the literature on reports dealing with cancer of the breast in prostatic pts. who received estrogen therapy and in women following admin. of estrogens reveals an accumulation of controversial, uncertain and equivocal evidence. The authors have personally observed during the last 15 cases of cancer which manifested itself as more or less prolonged and intensive estrogen therapy. In two of these cases estrogens could be proved responsible for the cancer. The authors conclude that even if the instances of estrogen-induced cancer appear to be rare, they undoubtedly exist and the indiscriminate and massive admin. of estrogen should therefore be avoided.

767 INTERACTION IN VIVO BETWEEN 3,4-BENZOPYRENE AND MOUSE SKIN DEOXYRIBONUCLEIC ACID. (Fr.) Jacquier, A. (Curie Lab., Radium Inst., Paris) and P. Daudel. *C.R. Acad. Sci. Paris* 258(23)(Group 14):5775-5776, 1964.

1-month-old Swiss female mice which had received a single application of 260 μ g of tritiated benzo(a)pyrene (BP) on the shaved skin of the scapular region, analysis of the painted area 16 hr. after treatment showed uptake of BP and proteins in the ratio of 1:5.

65-768 OCCUPATIONAL ONCOGENESIS BY AROMATIC AMINES: MEDICAL PREVENTION. (E.) Maltoni, C. (Clin. Occup. Med., U. Milan, Italy), G. Ghetti, V. Foà and G. Vallania. *Excerpta Med. (Int. Congr. Ser. #62)* 2:404-407, 1964.

Cystoscopy, cytological examination of the urinary sediment, and biochemical tests (urinary β -glucuronidase activity, urinary lactic dehydrogenase activity and detection of malignolipin) have been applied as methods for the early detection of neoplasms in 525 workers exposed to various aromatic amines in 2 dye factories in northern Italy. A total of 75 cases of benign and malignant tumors of the bladder, and 2 cases of tumors of the ureters and renal pelvises have been recorded. All of 8 cases of urinary tract tumors (6 in the bladder: 2 papilloma, 3 carcinoma, 1 tumor of the renal pelvis), which have been recorded since 1958, were detected by cytological examination. (See also the following abstract.)

65-769 TUMORS OF THE UPPER URINARY TRACT (KIDNEYS AND URETERS) IN WORKERS EXPOSED TO BENZIDINE IN A NORTH ITALIAN DYE FACTORY. (It.) Maltoni, C. (Clin. Occup. Med., U. Milan, Italy) and G. Ghetti. *Med. Lavoro* 55(5):365-368, 1964.

Case histories are reported for 4 male workers exposed to benzidine who developed malignancies of the upper urinary tract. Case 1 (> 8 yr. exposure) showed a left kidney tumor in addition to a papillary carcinoma of the bladder with metastasis to the iliac lymph nodes; Case 2 (12 yr. exposure) showed a renal tumor; Case 3 (13 yr. exposure) showed multiple carcinomas and diffuse papillomatosis of the renal pelvis and ureter; Case 4 (4 yr. exposure) showed a carcinoma of the ureter. In the same dye factory, bladder tumors have been found in 67 employees. The authors discuss (17 references) the carcinogenic effect of benzidine and other aromatic amines and explain the low incidence of upper urinary tract tumors as compared to those of the bladder.

65-770 THE ACTION OF THE CARCINOGEN N-(2-FLUORENYL)ACETAMIDE ON RAT LIVER CATALASE AND ARGINASE IN VIVO. (E.) King, C. M. (Dept. Biochem., Netherlands Cancer Inst., Amsterdam) and H. R. Gutmann. *Cancer Res.* 24(5):770-779, 1964.

Albino male rats (wt. 40-80 g) maintained on a semisynthetic 20% casein diet and vitamin mixture were pair-fed for 6 wk. with 0.54 ± 0.04 mmoles of 2-acetylaminofluorene (AAF) or N-hydroxy-AAF (N-OH-AAF). Both carcinogens depressed by 20-25% the activity of liver catalase but had no effect on liver arginase. The admin. of the non-carcinogenic metabolite 1-hydroxy-AAF (1-OH-AAF) had no effect on either liver catalase or arginase. Catalase isolated from rat liver after the i.p.

inj. of C^{14} -AAF (9.9 μ moles/100 g body wt.) or C^{14} -1-OH-AAF (5.4 μ moles/100 g body wt.) contained only negligible quantities of bound C^{14} , compared to controls previously untreated or treated with 3,4-benzpyrene. This finding supports the view that the covalent binding of AAF or one of its metabolites is not a probable mechanism for the inhibition of catalase *in vivo*. Determinations of total iron content of the liver after AAF-feeding gave no indication that a disturbance of the over-all iron metabolism was implicated in the lowering of the catalase activity. It is suggested that the partial inactivation of catalase *in vivo* by AAF and N-OH-AAF is due to a selective action of these carcinogens on enzyme synthesis or destruction.

65-771 LONG-TERM CARCINOGENICITY TESTS OF ORALLY ADMINISTERED ZINC AND TIN IN RATS AND MICE. (E., Abstract) Walters, M., F. J. C. Roe, E. Boyland and K. Millican. Pp. 63-64 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

No tumors were seen after approx. 14 mo. in rats fed continuously with a 20% protein diet containing 5% sodium chlorostannate or 0.83% stannous 2-ethyl hexoate, nor in appropriate controls. When pregnant mice and their progeny were fed the following agents, no excess of tumors of any site was seen: sodium chlorostannate in the drinking water; stannous oleate in 20% protein diet; zinc sulfate in the drinking water; zinc oleate; and 20% protein diet and water without the added chemical.

65-772 COMPARISON OF THE CARCINOGENICITY OF TWO PHARMACEUTICAL PREPARATIONS OF IRON INTENDED FOR PARENTERAL ADMINISTRATION. (E., Abstract) Roe, F. J. C., A. Haddow and B. C. V. Mitchley. P. 61 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

Chester Beatty male rats were treated 2x/wk. with inj. of Imferon (iron dextran) or Jectofer (iron-sorbitol-citric acid; both at 20 mg/kg of Fe), and treatment was stopped 1 yr. later after 78 inj. (total approx. 830 mg Fe/rat). Two local sarcomas were seen in the Imferon-treated animals 15 mo. after the start of the experiment, but no sarcomas were seen in the Jectofer-treated group. Toxicity occurred in some of the animals treated with Jectofer.

65-773 TESTS FOR CARCINOGENICITY USING NEWLY BORN MICE. (E., Abstract) Walters, M., F. J. C. Roe and G. A. Grant. Pp. 57-58 in British Empire Cancer Campaign 1963. Part 2:

Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

In newborn mice fed a high protein diet (25% casein) and treated at 24 hr. of age with an inj. of 9,10-dimethyl-1,2-benzanthracene (30 μ g) in aqueous gelatin, the incidence of leukemia and lung tumors was significantly higher than in mice fed a low protein diet (10% casein). A few lung tumors were seen in untreated controls or those treated with gelatin but the composition of the diet had no apparent effect on their incidence. The most suitable vehicles were aqueous gelatin and water, while arachis oil leaked out at inj. time; fewer tumors, however, arose in response to a particular dose of carcinogen admin. in arachis oil than to the same or a larger dose given in gelatin. When 20-methylcholanthrene was given in tricapylin, several tumors were seen at the inj. site. None of the 4 vehicles increased the incidence of tumors above the level seen in untreated controls.

65-774 RELATIONSHIP OF ADRENOCORTICAL INSUFFICIENCY TO SPONTANEOUS REGRESSION IN MAMMARY TUMOURS INDUCED IN RATS BY ORAL ADMINISTRATION OF DIMETHYLBENZANTHRACENE. (E.) Young, S. (Imperial Cancer Res. Fund, Lincoln's Inn Fields, London, W.C.2), J. E. Helfenstein and R. A. Baker. Nature (London) 203:1079-1080, 1964.

Sprague-Dawley rats, to whom 9,10-dimethyl-1,2-benzanthracene (DMBA; 50 mg in 2 ml corn oil) had been admin. by gastric intubation at day 50 of life, received cortisone acetate (C; 1-3 mg/d. for 1-3 wk.) starting on the day DMBA was given. The dose of DMBA caused extensive adrenal damage. The dose of C, which was considered a replacement dose, did not influence either the induction period of tumors or the incidence of tumors, which ultimately failed to grow or regressed.

65-775 STUDIES ON A METHYLCHOLANTHRENE-INDUCED FIBROSARCOMA OF THE RAT TESTIS AND ITS RESPONSE TO CADMIUM. (E.) Kar, A. B. (Cent. Dr. Res. Inst., Lucknow, India), V. P. Kamboj, A. Goswami and S. R. Chowdhury. Acta Biol. Med. German. 13(2):209-227, 1964.

20-Methylcholanthrene (25 mg in 0.5 ml gum acaci inj. into the right testis of adult male rats (100-120 g) produced fibrosarcoma of the testis in 2/75. While originally within the inguinal ring, at 365 days all the testes were located in the abdomen, a location which appears to favor tumor development. The tumor does not elaborate sex hormones nor is it hormone-dependent. However, there is some suggestion of a reciprocal metabolic relationship between the normal testis and the tumor. In general, the gross biochemical composition of the 2 tissues does not differ significantly except for some carbohydrate and lipid constituents.

776 SMOKING AND MOUTH-THROAT CANCER. (E.) Moore, C. (Dept. Surg., U. Louisville Med., Ky.). Am. J. Surg. 108(4):565-569, 1964.

8-yr. follow-up study is presented of 78 men and women (male:female ratio 2.5:1) with squamous carcinoma of the mouth or throat whose av. age was 57.6 yr. and who were living and well more than 3 yr. after treatment of the disease. Prior to the study, 66/78 had smoked more than 1 pack of cigarettes daily for an av. of 36.4 yr., while the remainder used various forms of tobacco (pipe, cigar, chewing tobacco, snuff, cigarettes and various combinations thereof) during the same time-all period. Among 29 who quit smoking after treatment, only 1 developed a second squamous carcinoma. Among 49 who continued smoking, 17 developed second cancers after an av. of 5.7 yr. The significant difference in incidences of first and second cancers is believed to support a causal relationship between tobacco and mouth-throat cancer.

77 SUMMARY OF 1964 BIOLOGY RESEARCH CONFERENCE. (E.) Dulbecco, R. (Calif. Inst. Biol. Studies, San Diego, Cal.). J. Cell. Comp. Physiol. 64(2)(Pt. 2):181-186, 1964.

A new perspective has been introduced in the area of mutagenesis: the demonstration of enzymes which recognize wrong sequences in DNA and excise them (work of R. B. Setlow). Mutagenesis thus may possibly be the result of errors in the DNA which are not corrected by certain repair enzymes. Code degeneration or certain other mechanisms are not completely understood molecular mechanisms but may be important mutagenic factors. Correlations between mutagenesis and carcinogenesis have been made difficult by the fact that these phenomena have been studied in widely separated forms of life, and experimentation in the same organism, as the mouse, is suggested. Chemical carcinogenesis might be based on the induction of structural changes within the genes, or possibly the result of the induction of a permanent change in a feed-back system which involves regulators of the structural genes. It may also be possible that carcinogens act by modifying the cell membrane. Viral carcinogenesis, on the other hand, is apparently based on a true genetic alteration of a type defined as infectious heredity.

78 TOXICITY OF WHOLE TOBACCO TAR. (E.) Flaks, A. (Dept. Exp. Path., U. Leeds Med., England). Nature (London) 204:592-593, 1964.

Four groups (each 24) of 4-week-old female inbred C57BL/6J mice painted on the skin of the back with whole tobacco tar (5-80 mg 3x/wk. for a total of 159 applications), only 2 papillomas developed at the site of painting. There was 1

carcinoma in a group of 24 mice treated with 160 mg/application, and 2 carcinomas in a group of 24 mice which received 20-80 mg/application. Toxicity occurred at a dose level of 80 mg/application. At 160 mg, mortality reached a level of about 50% within the first mo.

65-779 THE EFFECT OF LIVER IMBALANCE ON THE DEVELOPMENT OF ORAL TUMORS IN MICE FOLLOWING THE APPLICATIONS OF BENZOPYRENE OR TOBACCO TAR. (E.) Protzel, M. (Dept. Oral Path., Newark City Hosp., New Jersey), A. C. Giardina and E. H. Albano. Oral Surg. 18(5):622-635, 1964.

Inbred Swiss Webster mice (both sexes), inj. periodically with 10% carbon tetrachloride-olive oil soln. and/or given 15% aqueous ethyl alcohol to drink, were divided into 4 groups of 40 animals and 1 control group of 80 animals. The labial buccal mucosa was swabbed with 0.1% benzpyrene (BP) acetone soln. (0.016 mg BP 4x/wk.). Papillomas occurred in the sixth mo. in mice with induced liver damage, i.e., Group A (alcohol and carbon tetrachloride) and Group B (alcohol), and in the eighth mo. in control animals without induced liver damage (Group D, normal regimen). All surviving mice were sacrificed at the end of 12 mo. The percentages of papillomas and carcinomas based on the number of survivors at the end of one mo., were: Group A, 74% and 46% of 39; Group B, 84% and 50% of 38; Group C (CCl₄ only), 90% and 40% of 39; Group D, 42% and 15% of 40. In a continuing concurrent study, mice painted with 20% composite cigarette smoke condensate-acetone soln., with or without induced liver damage, have not shown evidence of tumor development up to the time of writing. The role of induced liver damage on oral tumor development is believed to be related only to its interference with BP metabolism.

65-780 INTERRELATIONSHIPS AMONG VARIOUS HISTOLOGIC CHANGES IN BRONCHIAL TUBES AND IN LUNG PARENCHYMA. (E.) Auerbach, O. (VA Hosp., East Orange, N. J.), A. P. Stout, E. C. Hammond and L. Garfinkel. Am. Rev. Resp. Dis. 90(6):867-876, 1964.

Histological studies were performed on the tracheo-bronchial epithelium of 758 men and women and the lung parenchyma of 1,340 men who died of diseases other than lung cancer. In non-smokers the occurrence of hyperactive glands, active in the processes of inflammation and repair, was not associated with changes in the nuclei of cells in tracheobronchial epithelium or with changes in the lung parenchyma. However, in cigarette smokers, the occurrence of hyperactive glands showed little correlation with the processes of inflammation and repair, but was associated with hyperplasia of the bronchial epithelium, with cells having atypical nuclei, and with such changes as fibrosis and rupture of alveolar septa in the lung parenchyma. Upon cessation of smoking, there is

evidence that atypical cells in the tracheobronchial epithelium slowly disappear, whereas changes in lung parenchyma appear to be arrested, but do not regress.

- 65-781 SNUFF. ITS USE AND ABUSE. (E.) Harrison, D. F. N. (Inst. Laryng. Otol., London). *Brit. Med. J.* 2:1649-1651, 1964.

The various uses and methods of preparation of snuff are described. Studies of 22 British snuff addicts revealed constant changes in the nasal passages with accumulation of particles in the middle meatus. These findings were used as a possible explanation for the association between snuffing and carcinoma of the maxillary antrum in the Bantu.

- 65-782 EFFECT OF SODIUM NITRITE AND p-AMINO-PROPIOPHENONE ON THE MINIMAL CARCINOGENIC DOSE₅₀ OF METHYLCHOLANTHRENE ON MOUSE EPIDERMIS. (E.) Orzechowski, R. F. (Dept. Pharm., Temple U. Sch. Med., Philadelphia, Pa.), R. F. Gautieri and D. E. Mann, Jr. *J. Pharm. Sci.* 54(1):64-66, 1965.

The effects of temporary hypoxia on tumor development was studied in groups of mice given topical applications of methylcholanthrene (MC; 0.02 ml of a 0.12% soln. in acetone, 2x/wk. for 72 days) in conjunction with biweekly i.p. inj. of the methemoglobin-forming agents sodium nitrite (SN; 50 or 100 mg/kg) and p-aminopropiophenone (PAPP; 5-20 mg/kg). No significant reduction in the incidence of epidermal tumors was noted in the SN- or PAPP-treated groups when compared with controls treated only with MC. However, a significant decrease in the incidence of tumors was noted in a group of mice treated similarly with sodium cobaltonitrite (SC). Since SC also induces methemoglobinemia, it is believed that tumor inhibition was not related to its hypoxic effect but might be due rather to the possible formation of certain cobalt complexes which exert an effect on cell growth and metabolism.

- 65-783 METABOLISM OF POLYCYCLIC COMPOUNDS. 25. THE METABOLISM OF ANTHRACENE AND SOME RELATED COMPOUNDS IN RATS. (E.) Sims, P. (Chester Beatty Res. Inst., London, S.W.3). *Biochem. J.* 92(3):621-631, 1964.

The metabolism of anthracene (AN) was studied through daily collection of urine from male Chester Beatty strain rats (wt. 250 g) maintained for 3 wk. on a diet containing 5% (by wt.) commercial AN. The rats converted AN into trans-1,2-dihydro-1,2-dihydroxy-AN, 1,2-dihydroxy-AN (which were excreted chiefly as conjugates of sulfuric acid and glucuronic acid) and trans-9,10-dihydro-9,10-dihydroxy-AN. Though the cis-dihydrodihydroxy compound was identified, it was believed it might have been formed during the

enzymic hydrolysis of the glucuronic acid conjugate of the trans-isomer. No 1- or 2-hydroxy-AN were found as urinary metabolites. Also noted was excretion of N-acetyl-S-(1,2-dihydro-2-hydroxy-1-anthryl)cysteine which is decomposed by mineral acid into 1-anthryl-mercapturic acid, 1- and 2-hydroxy-AN and AN. The urine of rats inj. i.p. with AN (50 mg) also contained 2-hydroxy-9,10-anthraquinone, anthrone and conjugates of 9-hydroxy-AN, 9,10-dihydroxy-AN and 2,9,10-trihydroxy-AN which were shown to be metabolic products of the trans-isomer in rats fed AN. In parallel experiments, 9,10-anthraquinone and anthrone were found to be metabolized by rats into 2-hydroxy-9,10-anthraquinone and conjugates of 9-hydroxy-AN, 9,10-dihydroxy-AN and 2,9,10-trihydroxy-AN. Anthrone and the sulfuric ester of 2-hydroxy-9,10-anthraquinone were obtained from 9,10-anthraquinone.

- 65-784 CHARGE-TRANSFER COMPLEX FORMATION, CARCINOGENICITY AND PHOTODYNAMIC ACTIVITY IN POLYCYCLIC COMPOUNDS. (E.) Epstein, S. S. (Child. Cancer Res. Found., Boston, Mass.), I. Bulon; J. Koplan, M. Small and N. Mantel. *Nature (London)* 204:750-754, 1964.

Charge-transfer complex formation was studied and compared in 45 carcinogenic and 62 non-carcinogenic polycyclic compounds by determination of their ability to produce colored complexes with iodine, chloranil, trinitrobenzene and acridine. A positive but imperfect association between photodynamic activity and complex formation was indicated in some compounds. However, this association did not appear to distinguish carcinogens from non-carcinogens, and was considered insignificant in the weaker carcinogens. Based on these data and other available evidence, it was suggested that charge-transfer complex formation does not play a significant role in determining the carcinogenicity of polycyclic compounds.

- 65-785 INDUCTION AND TRANSPLANTATION OF LEUKEMIA IN SL-STRAIN MICE. CYTOLOGIC AND HISTOLOGIC STUDIES OF THE LYMPH NODE. (Jap.) Inoue, J. (Dept. Path., Tottori U. Sch. Med., Japan). *Kyushu Ketsueki Kenkyu Dohokaiishi (J. Kyushu Hemat. Soc.)* 13(2):73-110, 1963.

Experimental studies in a total of 328 SL mice (approx. 4 wk. old) after a 1.5-yr. observation period revealed the following incidence of leukemia (L) and tumors induced by various procedures: 8/77 L (10.4%), which included 5 lymphatic leukemia (LL), 1 lymphosarcoma (LS), 1 myeloid leukemia (ML) and 1 intermediate type L, induced by testosterone propionate (0.05 mg/wk. s.c. x 15-30; total 0.75-1.5 mg); 2/82 mammary carcinoma and 10/82 L (12.2%), which included 5 LL (1/5 castrated (C) prior to treatment), 2 LS, 1 intermediate L in C mouse and 2/10 reticulosarcoma (RS; 1/2 C), induced by estradiol benzoate (0.04 mg/wk. s.c. x 30; total 1.2 mg) or

radiol propionate (0.5 mg every other wk. x 10; al 5 mg); 1 hepatoma and 8/63 L (12.7%), which luded 4 LL (1/4 C), 2 LS, 1 ML and 1 inter-iate L, induced by X-irradiation (150 r/wk. -6; total 750-900 r); 12/45 L (26.7%), which luded 6 LL, 3 LS, 1 ML, 1 intermediate L and S, induced in C animals receiving no other atment. In untreated mice there were 7/61 (5%) spontaneous L. Detailed histopathological cytological descriptions are included for n induced and transplanted tumor forms. In of the induced forms, electron microscope dies revealed the presence of a large number mature viruses ("C" particles). (See also 2(7):#1258, 1964.)

86 EFFECT OF CYCAD AND CYCASIN FEEDING ON LIVER RNA, DNA, SUCCINIC OXIDASE, AND DS IN THE RAT. (E.) Williams, J. N., Jr., Bethesda). Fed. Proc. 23(6)(Pt. 1): -1375, 1964.

and stock ration containing cycad meal (1-5%) ycasin (0.1-0.4%) was fed for 1-8 days to g male albino rats (50-60 g), then the rats sacrificed and various components of their r analyzed. With the cycad meal, the suc-oxidase showed depression, RNA and total pholipids showed marked depression, whereas plasmalogens, cholesterol, and neutral gly-ides showed no change. With ycasin, RNA total phospholipids showed depression, esterol and neutral glycerides showed eleva-, whereas succinic oxidase, DNA, and plasma-s showed no effect.

87 RATES AND KINETICS OF CATALASE SYN-THESIS AND DESTRUCTION IN RATS FED D AND CYCASIN IN VIVO. (E.) Rechcigl, M., Jr., Bethesda). Fed. Proc. 23(6)(Pt. 1): -1377, 1964.

sin, 5-50 mg/100 g of ration, had practically effect on the level of liver catalase activity in rats. A decreased CA occurred in some at 75 mg/100 g, and practically all rats ed a decrease in CA at 100 mg/100 g. At mg/100 g, there was a 50% reduction in CA compared to pair-fed controls). Feeding of ycad diet resulted in almost 50% reduction A. Since there is about 30 mg of cycasin 00 g of cycad meal, it was therefore con-eded that there are additional factors besides sin in cycad meal which are involved in the ing of CA. The kidney CA was not signif-ly affected by cycasin or cycad meal feeding. rates of catalase synthesis and destruction vo were determined in control and cycasin-fed mg/100 g) animals. There were approx. 5.6 catalase synthesized per hour by controls, only approx. 1.1 U in the cycasin-fed animals. rates of destruction of catalase were approx. ame in both groups.

65-788 INDUCTION OF HEPATIC AND RENAL TUMORS BY TOPICAL APPLICATION OF AQUEOUS EXTRACT OF CYCAD NUT TO ARTIFICIAL SKIN ULCERS IN MICE. (E.) O'Gara, R. W. (NCI, Bethesda), J. M. Brown and M. G. Whiting. Fed. Proc. 23(6)(Pt. 1):1383, 1964.

Croton oil-induced ulcers on the back of 16 young adult male C57Bl mice were painted 1-3x/day with an aqueous soln. of cycad nut until the ulcer healed, each ulcer requiring 3-17 paintings. Among 11 survivors, tumors developed in 3 mice 12-14 mo. after the start of the experiment. One mouse had a solitary hepatic hemangioendothelioma; a second mouse had a large renal adenoma and a multilocular hepatic cyst; a third mouse had a hepatoma, bilateral renal adenomas, and an s.c. hemangioma at the inj. site. No comparable lesions were found in 15 controls. In discussion it was stated that the sap of the fresh cycad nut is commonly used to heal open wounds and tropical ulcers in Indonesia, Manus, the Philippines, Indo-China, India, Guam, and the Dominican Republic.

65-789 CARCINOGENIC EFFECT OF CYCAD MEAL IN GUINEA PIGS. (E.) Spatz, M. (NIH, Bethesda). Fed. Proc. 23(6)(Pt. 1):1384-1385, 1964.

A total of 350 male guinea pigs (NIH strain; wt. 250-300 g) were fed cycad meal (CM) at conc. of 5, 6, 7, or 10% in the basal diet for 5-day periods once or twice. Mortality was 13%, 37%, 65%, and 100%, resp., within 14 days. Edema of pancreas and adipose tissue, ascites, and hepatic necrosis were found at CM conc. of 6-10%. Animals fed with 5% CM showed a decrease in liver glucose 6-phosphatase activity although only 40% of the animals showed histologic evidence of liver injury. Late effects of cycad toxicity included marked bile duct proliferation, telangiectasia, cirrhosis, occasionally nodular hyperplasia, and infarcts of the liver. Liver tumors were found in 9/27 guinea pigs sacrificed 44-62 wk. after initiation of 5% cycad meal; 5 were composed of bile ducts while 4 were hepatocellular in type. No tumors were found among 90 guinea pigs which did not receive cycad meal. (See also the following abstract.)

65-790 EFFECTS OF CYCAD MEAL AND CYCASIN ON HISTOCHEMICALLY DEMONSTRABLE LIVER PHOSPHATASES AND NONSPECIFIC ESTERASES. (E.) Spatz, M. (NIH, Bethesda). Fed. Proc. 23(6)(Pt. 1):1381-1382, 1964.

A centrolobular decrease in liver glucose 6-phosphatase (GP-ase) was seen in guinea pigs 5 days after cycad meal (CM) feeding. Centrolobular necrosis of the liver was accompanied by histo-chemically demonstrable decreases in mitochondrial and adenosine triphosphatase (AT-ase) activities. An increase in the alkaline phosphatase (AP-ase) activity was related to the presence of a poly-morphonuclear reaction. Similar changes were seen

in CM-fed rats. Some rats were also fed cycasin (CS) for 2 days. Those fed 200-400 mg/100 g showed a decreased activity of GP-ase and 5-nucleotidase. Hepatic AT-ase activity was decreased in centrilobular areas in a few rats, and was generally increased in the periportal region. Rats fed CS (25-100 mg/100 g) showed only a decrease of GP-ase, while the hepatic AT-ase seemed increased. It was concluded that CM and CS probably interfere with early carbohydrate metabolism reactions and that microsomal injury is probably one of several early toxic effects of the cycad nut. Rats fed 75 mg/100 g CS for 1-10 days showed altered hepatocellular distribution of the esterase (E-ase) activities when naphthol AS-D acetate and 5-bromo-4-chloroindoxyl acetate were used as substrates. A loss of uniformity of the peribiliary granular E-ase occurred in the livers of rats maintained 1 day on the CS diet; this was manifested in most cases as a slight decrease in activity in the central and periportal zones after day 2. It is not certain whether these findings represent an actual hepatocellular loss of E-ase activity.

- 65-791 CHEMICAL CARCINOGENESIS *IN VITRO*. (E.) Powell, A. K. (Mt. Vernon Hosp., Northwood, Middlesex, England) and J. Wright. Pp. 238-243 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

In cultured lung, skeletal muscle and skin explants from 15-16-day-old August rat embryos treated *in vitro* with β -propiolactone (P), the induction of histological malignancy was produced by daily treatment near the tolerance limits of the cells. Both M/2500 and M/5000 conc. of P suppressed all cell divisions for about 3 days, but after day 4, the epithelial cells divided at the control rate and progressive alterations in the cells then began to occur; fully developed altered cells appeared in upwards of a wk. Altered fibrocytes which closely resembled sarcoma cells were also observed. Lung cultures treated with 1 application of M/1000 of P medium showed monocytes in mitosis about 3 wk. later, but before this outburst of division, many of the monocytes had changed morphologically; daily P treatment did not produce these changes. The results suggest that P is carcinogenic *in vitro* but it has not yet been possible to test the altered cells for malignancy by *in vivo* implantation.

- 65-792 CARCINOGENIC ACTIVITY OF CERTAIN LACTONES AND RELATED SUBSTANCES. (E.) Dickens, F. and H. E. H. Jones. Pp. 7-8 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

After a review of the authors' earlier work (see CRA 1(1):#72, and *ibid.*, (5):#872, 1963; *ibid.*,

2(3):#484 and *ibid.*, (4):#671, 1964), it was reported that the following compounds have produced 1 or more local tumors at or near the inj. site after about 1 yr. of tests: purified β -angelicalactone (AL), phenyl vinyl ketone (PVK), vinylencarbonate (VC), α -methyl tetronic acid (MTA) and aflatoxin (most active; see CRA 2(3):#484, 1964). VC produced 4 tumors in 6 rats and PVK produced 2 tumors; AL and MTA produced 1 tumor each. In a continuing experiment, the following substances did not produce tumors: succinic anhydride, N-ethyl maleimide, bovolide, α,β -dimethyl maleic anhydride, maleic hydrazide, coumalic acid, 6-aminopenicillanic acid, coumarin, diethylstilbestrol and diethylstilbestrol epoxide.

- 65-793 STUDIES IN NUCLEAR CHANGES DURING CARCINOGENESIS. (E.) Rees, K. R., G. F. Rowland, J. S. Varcoe and J. I. Rodwell. Pp. 340-341 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

Hepatocarcinogenic doses of thioacetamide (T) or dimethylaminoazobenzene (DAB) were fed to rats. T caused marked morphological changes in the liver parenchymal cell nuclei (enlargement of the nucleolus with conc. of the chromatin into strands radiating from it to the periphery) within 4 days; these changes were accompanied by changes in the lipid, RNA and DNA content of the fractions in relation to the protein nitrogen. DAB caused virtually no morphological change in the liver cell nuclei within 2-3 wk. but small chemical changes were seen as shown by an increase in the phospholipid, a small decrease in RNA and a decrease in DNA. When C^{14} -labeled DAB was admin. for 14 days p.o. to rats, and the livers were fractionated to yield both sub-cellular and subnuclear fractions, it was found that the major binding of C^{14} was to protein in the cell sap; lowest binding occurred in the nuclear protein fraction. Within the nucleus the chromosomal protein possessed the highest activity.

- 65-794 EARLY EFFECTS OF CARCINOGENIC AZO-DYES ON CYCLE ENZYMES. (E.) McLean, P. Pp. 10-11 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

In a continuation of CRA 2(8):#1488, 1964, ethionine was given in the diet at a conc. of 0.25% and after 2 wk. of treatment the liver arginase activity was increased about 50% and the ornithine transcarbamoylase was decreased to approx. 50% of the control value which was similar to the effect produced in the previous experiment with azo dye alone. The glucose-6-phosphate dehydrogenase was markedly increased while the 6-phosphogluconate dehydrogenase remained unchanged.

- 65-795 THE EFFECT OF POLYCYCLIC HYDROCARBONS ON THE TRANSFORMING ACTIVITY OF DNA FROM

PNEUMOCOCCUS. (E.) Green, B. Pp. 75-76 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

in conjunction with F. M. Sirotnak and D. J. Chison, a soln. of pneumococcus DNA with transforming activity (TA) towards the wild strain for resistance to sulfanilamide, amethopterin, streptomycin and erythromycin was shaken in the dark for 16 hr. with a polycyclic hydrocarbon, centrifuged and the TA was measured. For a given soln. the reduction in TA was more pronounced with amethopterin and erythromycin, which are believed to occupy larger genetic sites, as compared with streptomycin. Anthracene and 7,12-dimethyl-1,2,3,4,9,10-hexabenzanthracene were most effective, while benzene, benzanthracene and pyrene had a smaller, though definite inhibitory effect. When EDTA (5 mM) was included in the DNA soln. before mixing, there was a marked increase in the TA of hydrocarbon-treated and control DNA; the overall effect was to afford considerable but not complete protection against the effect of the hydrocarbon. There was a 60% reduction in TA of P₃₂-labeled DNA after benzpyrene treatment and less than 20% reduction in irreversible uptake of P₃₂. (See CRA 1(4):#642, 1963.)

96 STUDIES ON THE CONCENTRATION AND SYNTHESIS OF PYRIDINE NUCLEOTIDES IN "PRE-NEOPLASIA" LIVER AND PRIMARY HEPATOMAS. (E.) Green, P. (U. College, London), A. L. Greenbaum, J. Clark and E. Reid. P. 12 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

In continuation of CRA 2(2):#266, 1964, the authors noted that after feeding of 4-dimethyl-5-aminoazobenzene (DAB) derivatives (3'-methyl-DAB (F-DAB), the extra acid-labile form of NADP was approx. equal to the acid-stable form in pre-neoplastic livers, but the previous experiment indicated that it had virtually disappeared in the hepatomas. When the conc. of pyridine nucleotides was measured in livers of somatotropin and glucocorticoid-treated rats and adrenalectomized (adx.) and cortisol-treated adx. rats, the most striking effect was an 80% decrease in the NADP content of adx.; this effect was reversed by cortisol.

97 TUMOUR OF THE THYMUS IN MAGNESIUM-DEFICIENT RATS. (E.) Bois, P. (Dept. of Path., U. Montreal, Canada). Nature (London) 207:316, 1964.

Magnesium-deficient diet fed for 95 days to 12 Holtzman Sprague-Dawley rats (wt. 110-125 g) resulted in lethal convulsive seizures within the

first few wks.; in rats dying later, extensive pleural effusion and ascites were present; only 5 rats survived till the end of experiment. Two rats developed large, transplantable, thymus tumors (1/2 found after 75 days, 1/2 at the end of experiment) which showed a predominance of large lymphocytes or lymphoblasts with numerous mitotic figures. No tumor of the thymus was found in 20 controls that were not magnesium-deficient. The experiment was repeated, and so far 6 tumors of the thymus have been observed among 138 magnesium-deficient rats after 75-105 days.

65-798 LEVEL OF PROTEIN-BOUND AMINOAZO DYES IN RATS GIVEN ANABOLIC HORMONES. (E.) Azarmie, S. (Dept. Path., U. Melbourne, Australia). Oncologia (Basel) 18(3):225-228, 1964.

Eight adult male Wistar rats (wt. 152-220 g) were fed diets containing 0.06% of 3'-methyl-4-dimethyl-aminoazobenzene (MeDAB); 4/8 were also inj. with Durabolin (D), 25 mg i.m. The rats were sacrificed after 11 days, and protein-bound derivatives of the dye determined in the livers. The optical absorption at 520 mμ of liver powders from rats given MeDAB + D was 0.064; in rats given MeDAB alone, it was 0.021; in 3 controls, it was 0.017. These results support the findings that measures which increase the rate of protein synthesis augment the binding of carcinogenic aminoazo dyes to rat liver protein. The susceptibility of male rats to aminoazo dye carcinogenesis may be related to the anabolic activity of naturally produced androgens.

65-799 STIMULATORY EFFECT OF 3-METHYLCHOLANTHRENE ON ACETOPHENETIDINE METABOLISM IN THE CAT. (E., Abstract) Welch, R. M. (Wellcome Res. Lab., Tuckahoe, N. Y.), M. Sansur, A. H. Conney and J. J. Burns. Pharmacologist 6(2):207, 1964.

65-800 AGE AND STRAIN-DEPENDENCE OF URETHANE LEUKAEMOGENESIS AND HEPATOMAGENESIS IN MICE. (E., Abstract) Harvey, J. J. P. 219 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

65-801 NEUROTOXIC EFFECTS FROM CYCAD LEAVES. (E., Abstract) Anderson, J. L. (Dept. Agric., Inst. Anim. Res., Brisbane, Australia) and W. T. Hall. Fed. Proc. 23(6)(Pt. 1):1349, 1964.

See also abstract nos.: 655, 656, 661, 662, 665, 669, 670, 671, 675, 676, 677, 679, 682, 684, 686, 689, 691, 692, 698, 709, 851, 852, 853, 856, 889, 902

VIRAL CARCINOGENESIS

- 65-802 IMMUNOFLUORESCENT STUDIES OF ADENOVIRUS 12 TUMORS AND OF CELLS TRANSFORMED OR INFECTED BY ADENOVIRUSES. (E.) Pope, J. H. (NIH, Bethesda) and W. P. Rowe. J. Exp. Med. 120(4):577-587, 1964.

Complement-fixing antibody sera prepared from hamsters with adenovirus 12 (Ad-12)-induced tumors showed specific immunofluorescent stainable antigens in almost all Ad-12 hamster tumor cells tested. Usually the antigens were characterized as cytoplasmic flecks, but occasionally the staining appeared as nuclear flecks or homogeneous nuclear or cytoplasmic staining in some cells. Conjugated Ad-12 rabbit antiserum, or A and C antigens failed to stain the tumor cells. An Ad-12 induced tumor in BALB/c mice and Ad-12-transformed hamster embryo tissue culture cells showed staining of cytoplasmic flecks by the hamster serum. Hamster and human cell cultures inoc. with homologous and heterologous adenovirus types showed fleck-shaped antigens which were stained by the hamster serum, though no reaction occurred between the hamster cells and the rabbit Ad-12 antiserum. Studies revealed that the fluorescent stainable fleck-shaped antigens have not been previously identified as viral antigens, while the cytoplasmic antigens found in Ad-12 inoc. hamster cell cultures differed from those in tumors or in acutely infected human cell cultures.

- 65-803 LYMPHOCYTIC ACTIVITIES IN RUNT (HOMOLOGOUS) DISEASE AND LEUKEMIA. (E.) Sinkovics, J. G. (Dept. Med., U. Texas M. D. Anderson Hosp., Houston), C. D. Howe and C. C. Shullenberger. Oncologia (Basel) 18(1):1-8, 1964.

Normal BALB/c mice inoc. with Rauscher leukemia virus died 3 mo. earlier than similarly inoc. mice with chronic runt disease; tissue cultures prepared from the latter group showed lymphocytes which penetrated and vacuolized some other cells. In certain other reactions, the lymphocytes and the target cells succumbed to an immunologic death. In human leukemic bone marrow tissue cultures, it was noted that lymphoid cells entered the cytoplasm of fibroblast-like cells which had originated in the culture, but damage to either type of cell was rare.

- 65-804 CYTOLOGY OF THE CANINE ORAL PAPILLOMA. (E.) Cheville, N. F. (Nat. Anim. Dis. Lab., Ames, Iowa) and C. Olson. Am. J. Path. 45(5):849-872, 1964.

A suspension of the Seattle A strain of virus from naturally occurring papillomas was inj. into the oral mucosa at 12 sites of gingiva in mongrel dogs (under 1 yr. of age). Papillomas appeared 4 to 6 wk. later and were biopsied at regular intervals. The cytopathologic, immunofluorescent, and electron microscope findings are described

and illustrated in detail. The sequence of events in tumorigenesis consisted of: (1) hyperplasia of keratin-producing, apparently virus-free cells; (2) appearance of large vesicular non-keratogenic cells, containing Feulgen positive inclusions in the nucleus and fluorescing upon incub. with conjugated anti-papilloma gamma globulin. Virus particles first appeared in cells of the upper stratum spinosum. The virus is composed of a capsid consisting of an inner core and of capsomeres; it fulfills the requisites for membership in the papova group of viruses.

- 65-805 MOUSE ANTIBODY PRODUCTION TEST FOR THE ASSAY OF THE MOLONEY VIRUS. (E.) Klein, E. (Dept. Tumor Biol., Karolinska Inst. Sch. Med., Stockholm) and G. Klein. Nature (London) 204:339-342, 1964.

A mouse antibody production (MAP) test for virus assay is described. Several lines of Moloney lymphomas were used as target cells. The fluorescent index was found to be more sensitive and reliable than the cytotoxic index. All 5 tumor lines tested (YAC; YAA; YDAB; YHA; and YLD) released virus, including those that had been carried through 18-22 passages; 2 lines (YHA and YDAB) released larger quantities than the rest. Inactivation of the virus by hydroxylamine prevented antibody formation. Dilution of the inoc. virus resulted in delaying antibody formation in mice. Immune serum (from resistant mice) neutralized the immunogenicity of virus-containing homogenates, i.e., inoc. with the standard virus-containing homogenate plus an admixture of immune serum caused complete inhibition of antibody formation during the entire observation period of 66 days. The virus-neutralizing ability of anti-Moloney sera was also evident when oncogenic activity was neutralized in newborn A x DBA/2 F₁ mice which were inoc. with the virus-containing homogenate mixed with the immune serum. A number of other sera were also tested in this manner. Only the sera of mice resistant against Moloney lymphoma cells were able to neutralize the immunogenic effect of the inoculum, while anti-Gros anti-6C3HED, and anti-polyoma sera had no detectable neutralizing effect. No neutralizing effect was found when the virus homogenate derived from A x DBA/2 F₁ lymphoma was treated with H-2 iso-antiserum against the virus-donor cell genotype. (See also CRA 2(5):#931, 1964.)

- 65-806 GLYCOLYSIS AND RESPIRATION OF TRANSFORMED BHK21 CELLS. (E.) Broadfoot, M. (Inst. Biochem., U. Glasgow, Scotland), P. Walker, J. Paul, I. Macpherson and M. Stoker. Nature (London) 204:79, 1964.

Baby hamster kidney cells (BHK21) were transformed *in vitro* by the SE polyoma virus into 4 clones designated A, C, Y and Z. A and C were

phologically untransformed and showed very low transplantability, while Y and Z were transformed, showed high transplantability. Oxygen uptake (hr./mg DNAP) was 439-550 and 451-659 for A, Y, resp. Glucose uptake ($\mu\text{M/hr./10}^9$ cells) for a 17-hr. period was 317-418, 190-347, 574-667, 777-978 for A, C, Y and Z, resp. Though these findings support Warburg's observation that tumor cells have a higher rate of aerobic glycolysis than normal cells, they do not support his conclusion that this may be attributed to irreversible damage to the respiratory pathways of tumor cells. Further experimentation along these lines and a reappraisal of the role of glycolysis in carcinogenesis are suggested.

807 TUMORS PRODUCED BY ROUS SARCOMA VIRUS (CARR STRAIN) IN HAMSTERS. (E.)
Ilyagin, V. Ya. (Gamaleya Inst. Epidemiol. Microbiol., USSR Acad. Med. Sci., Moscow). *Fed. Biol. Sci. (Transl. Suppl.)* 23(5) (Part II):T1031-T1032, 1964.

This article is the English version of a Russian article appearing in *Vop. Virus.* 8(5):617-, 1963. *CRA* 2(2):#298, 1964.

808 LEUKEMIA INHIBITION? HYPOTHESIS AND PRELIMINARY REPORT ON THE USE OF THYMUS EXTRACTS OF THYMUS IN MOUSE LEUKEMIA. (E.)
Fischer, F. R. (H. L. Snyder Mem. Res. Found., Kansas, Kan.) and E. N. Miller. *J. Kansas Med.* 65(11):548-550, 1964.

Thymus gland extract of fetal calves (0.5 ml/day i.m.) was inj. into C₃H adult mice and followed by admin. of whole cell emulsion of AKR leukemia. Over 50% of the mice died with leukemia in 3 wk.; 23/30 developed leukemia. C₃H mice receiving the thymus extract or leukemic inoc. showed no evidence of leukemia. All AKR control mice developed leukemia within 3 wk. of inoc. Retransferring the leukemia from 1 group of C₃H mice to another group of C₃H mice was accomplished only when extract of fetal calf thymus was admin. along with the leukemic whole cell inoc. Transferring the leukemia from C₃H mice to 2 AKR mice was accomplished without the thymus extract.

809 AN ELECTRON MICROSCOPE STUDY OF RAT LEUKEMIA INDUCED WITH MOUSE LEUKEMIA VIRUS (GROSS). (E.) Dmochowski, L. (U. Texas M.D. Anderson Hosp. Tumor Inst., Houston), Edgett and L. Gross. *Cancer Res.* 24(5):1999, 1964.

Electron microscope studies of various tissue sections of Sprague-Dawley and Osborne-Mendel (2.5-4-months old) inoc. i.p. with passage 10 leukemia virus revealed 2 types of particles. One type, described as mature virus particles, had an av. diameter of 990 Å and an

electron-dense nucleoid centrally or excentrically located and surrounded by 1 or 2 membranes; the other type, described as immature viral particles, were vesicular or doughnut-shaped with an electron-lucent center surrounded by an inner and an outer membrane. Megakaryocytes of the bone marrow and spleen contained both types of particles; however, the intercellular spaces, and occasionally the cytoplasmic inclusions, of cells in the lymph nodes, spleen, and mediastinal tumors contained mostly the mature virus particles. Particle formation, which was sometimes observed in all the organs examined, is described. No particles were noted in over 50 specimens from 15 normal rats. (See also *CRA* 1(5):#834, 1963.)

65-810 ORAL CHANGES IN SWISS MICE INFECTED WITH POLYOMA VIRUS. (E., Abstract)
Cohen, M. M. (Tufts U. Sch. Dent. Med., Boston, Mass.) and G. Shklar. *J. Dent. Res.* 43(5) (Suppl. 2):895-896, 1964.

No apparent effect on dental development was evident in 10 Swiss mice infected at birth with polyoma virus (PV) and sacrificed at 2 wk. A second, similarly infected group of 10 mice, showed inflammatory infiltration of the gingiva, apical migration of the epithelial attachment along the cementum with resorption of the cementum, degeneration of the odontoblasts in the dental pulp and total necrosis of the pulp and periapical abscesses in carious teeth. In a third group, 6-8-month-old mice infected with PV showed severe periodontal breakdown with pocket formation, bone resorption, and purulence. Animals of the latter 2 groups had tumors of the parotid glands and other tissues.

65-811 ISOLATION OF ADENOVIRUS FROM A HUMAN CASE OF PULMONARY CARCINOMA. (E., Abstract) Bronitki, A. (Inst. Inframicrobiol., Rumanian Acad. Sci., Bucharest), R. Demetrescu, G. Popescu and A. Malian. *Acta Virol. (Praha)* (Eng.) 8(5):472, 1964.

Adenovirus type 12, having several fractions in common with type 3, was isolated from 5 cases of human pulmonary carcinoma. The appearance of giant cells, atypical mitoses, and the presence in large numbers of small-sized cells with "tachy-chromic" nuclei were observed starting from the first or second passage of the 5/5 viruses. There may be a possible relationship between the oncogenic property of the virus and human pulmonary carcinoma.

65-812 IN VITRO STUDY OF RABBIT SUBMAXILLARY GLANDS TREATED WITH SHOPE PAPILLOMA VIRUS. (E., Abstract) Fleming, H. S. *J. Dent. Res.* 43(5) (Suppl. 2):813-814, 1964.

The mitotic activity of infected salivary gland cells increased, and abnormal configurations of

the cells undergoing mitotic division were seen. As compared to controls, the treated cells showed a disturbance in the prophase index and a different pattern of development.

- 65-813 KARYOLOGICAL INVESTIGATIONS IN MOUSE LEUKEMIAS. (E.) Khrustalev, S. A. (Centl. Inst. Hemat. Blood Transf., Moscow). Fed. Proc. (Trans. Suppl.) 23(5)(Pt.2):T1015-T1017, 1964.

This article is the English version of a Russian article published in Probl. Gemat. 8(11):26-, 1963. In 15 C57BL mice with transplanted leukemia-hemocyto blastosis (Puiman's strain), karyological studies of the metaphases of bone marrow cells revealed that approx. 10% of the cells contained 41 chromosomes as did 29.5%-55.0% of the spleen cells of 5 of the mice, in contrast to the normal chromosome number of 40. Additional studies are suggested to determine the morphology and role of the additional chromosome. An attempt should also be made to establish why this disturbance occurs more frequently in spleen cells than in cells of the bone marrow.

- 65-814 BRAIN TUMOURS INDUCED IN HAMSTERS INOCULATED INTRACEREBRALLY AT BIRTH WITH ROUS SARCOMA VIRUS. (E.) Rabotti, G. F. (NCI, Bethesda) and W. A. Raine. Nature (London) 204:898-899, 1964.

The Schmidt-Ruppin strain of Rous sarcoma virus (RSV), derived from chicken wing's web sarcoma, was inoc. intracerebrally into newborn Syrian hamsters < 24 hr. old. Inoculum titers of 7.6×10^3 , 3.024×10^5 , 1.512×10^5 , 1.512×10^4 and 1.512×10^3 PFU (in chicken chorioallantoic membrane) caused neurological symptoms in 18/20, 14/14, 24/24, 15/15 and 8/9 animals, resp., and which appeared after 18-56 days. In all animals which had shown neurological symptoms, histological studies showed the presence of multiple diffuse tumors bilaterally located in the cerebral hemispheres which rarely involved the meninges, and did not extend to the ependymal lining of the ventricles. The tumors contained small amounts of glial fibrils and consisted of large round cells with basophilic cytoplasm or bundled fusiform cells. A diagnosis of glioma was made. These tumors differed from those induced in the same species by polyoma virus, and those induced in the chicken brain by the Bryan strain of RSV.

- 65-815 DISTRIBUTION OF SL LEUKEMIA VIRUS ANTIGEN. (Jap., Abstract) Ichikawa, Y. (Dept. Vir. Res., Kyoto U. Sch. Med., Japan) and K. Notake. Birusu (Virus) 13(5-6):249-250, 1963.

Inoculation of SL mouse leukemic viruses into young S strain mice induced leukemia in approx. 50% of females and in approx. 20% of males. S lymphatic leukemia cells thus induced were

transplanted i.p. in mice (probably S strain), followed thereafter by placement of the cells in bottle culture. The cells continued to be cultured in serial passages for approx. 2 yr.; they were then designated SC-1 cells. Electron microscopic studies of SC-1 cells revealed numerous virus particles (80-95 mμ) on the surface of the cells but not in the cytoplasm or nucleus. Immunologic studies of these cells by the fluorescent antibody technic disclosed localized intense fluorescence which surrounded the cells. In the phase of nuclear division, nearly half of the cells showed positive fluorescence, indicating that the production of antigen does not interfere with nuclear division. Virus antigen was rarely identifiable in leukemic organ tissue (less than 1%), presumably because of the relative reduction of antigen in such gross specimen.

- 65-816 POLYOMA VIRUS: PRODUCTION IN BACILLUS SUBTILIS. (E.) Bayreuther, K. E. (Dept. Biol., California Inst. Tech., Pasadena) and W. R. Romig. Science 146:778-779, 1964.

Competent cultures of B. subtilis 168-23 (a diauxotroph requiring histidine and indole), harvested after 28 hr. of incub. with DNA extracted from purified polyoma virus, produced in the supernatant (after grinding and centrifuging) complete polyoma virus, at a rate of about 1 PFU for each molecule of DNA added to the bacterial culture. Results of further tests indicated that the polyoma virus was not only taken up into the infected bacteria, but was actually replicated there, and that this bacterial virus was identical with the polyoma virus produced by animal cells.

- 65-817 HOW MANY DIFFERENT VIRUSES CAUSING LEUKEMIA IN MICE? (E.) Gross, L. (Cancer Res. Unit, VA Hosp., Bronx, N. Y.). Acta Haemat. (Basel) 32(1):44-62, 1964.

Studies in mice of the pathogenic and physical properties, host range, and morphology of the Passage A mouse leukemia virus, the Graffi mouse leukemia virus, the Moloney virus, and Passage X (radiation-induced) virus, indicate that, despite the wide variety of lymphoid diseases induced (leukemias and lymphomas), all are actually a single virus, or one of its close variants. It is suggested that this virus be designated "mouse leukemia virus Type A". There may be a slight antigenic difference between some isolated viral strains, but these do not represent distinct viruses. See also CRA 1(9-10):1645, 1964.

- 65-818 RESPONSE OF CULTURED RABBIT CELLS TO INFECTION WITH THE SHOPE FIBROMA VIRUS. I. PROLIFERATION AND MORPHOLOGICAL ALTERATION OF THE INFECTED CELLS. (E.) Hinze, H. C. (Dept. Med. Microbiol., U. Wisconsin Sch. Med., Madison) and D. L. Walker. J. Bact. 88(4):1185-1194, 1964.

of this material was abstracted as CRA 1(5): , 1963. Rabbit kidney cells, cultured under conditions which favor rapid growth, when infected with Shope fibroma virus (Putuxent strain; PFU), showed growth inhibition for 2-3 days; thereafter, the infected cultures continued to grow at a normal rate. However, their cell morphology and culture growth pattern were altered, beginning at about 3 days after infection, cells became larger, and more spindle-shaped, than controls. Numerous cytoplasmic inclusions were evident in infected cells 24-48 hr. following infection. When 10^5 or 2×10^6 such virus-transformed cells were inoc. into the cheek pouches of Syrian hamsters, they multiplied, and, in the case of the larger dose, formed tumors in 7/8.

9 INOCULATION OF CHICKEN SARCOMA INTO CHICKEN THYMUS. AN ELECTRON MICROSCOPIC OBSERVATION. (Jap.) Nishiumi, Y. (Cancer Res. Inst., Kyushu U. Sch. Med., Fukuoka, Japan). *Kenkyu (Acta Med.)* 32(1):34-45, 1962.

White leghorn chickens (120-150 days old), inoculated with 0.5-1.0 ml of Chiba chicken sarcoma virus suspension into the thymus gave rise to sarcoma cell proliferation in the interlobular connective tissue after 4 days, accompanied by appearance of virus on the surface of these cells. After 6-7 days, 3/8 samples studied contained a certain number of sarcoma cells which were accompanied by as many as 100-500 virus particles in and around the cells. The virus particles were cubic in shape, were an av. 75 mμ in diameter, and contained nucleoids in the center of the virus. The virus particles found in the cytoplasm were larger and were oval in shape.

0 CYTOGENETIC STUDIES OF THREE CLONES DERIVED FROM A PERMANENT LINE OF HAMSTER CELLS TRANSFORMED BY SV40. (E.) Cooper, P. (NIH, Bethesda) and P. H. Black. *J. Cell. Physiol.* 64(2):201-220, 1964.

Three clones (THK-CL 3-3, THK-CL 4-1 and THK-CL 5-1) were isolated after passage 29 from single cells of the permanent THK-1 line of Syrian hamster cells. These cells were transformed *in vitro* by SV40. Chromosome preparations were made from cells of the 3 clones at passages 3, 10 and 35. Progressive deterioration of the original karyotype of the parent cell with failure to establish a stable stem line was noted in the cells of each of the 3 clones. These cells also showed an increased tendency for chromosome breakage, fragmentation and rearrangement. Recurrent structural rearrangement and irregular replication of various chromosome groups apparently caused aneuploidy, which was believed to be related to the presence of viral genetic material and demonstrated by the infectious virus which was subsequently recovered from each of the clones. These phenomena are believed to be due to the integration of viral DNA in subinfectious

form within the chronically infected cell. (See also CRA 1(5):#930, 1963; and *ibid.*, (12):#2157, 1964.)

65-821 STUDIES ON THE GENETIC SUSCEPTIBILITY OF CELLS TO POLYOMA VIRUS TRANSFORMATION. (E.) Black, P. H. (NIH, Bethesda). *Virology* 24(2):179-185, 1964.

Transformation (induction of heritable change) in hamster fibroblasts (C13) derived from the 8HK21 line by a small plaque variant derived from the Toronto strain of polyoma virus was studied. A striking homogeneity in the transformation rate indicated that the vast majority of clones are transformable to approx. the same degree, suggesting that the 5%-10% ceiling in the transformation rate is not due to the presence of genetically insusceptible cells. Only 2/8 plates examined revealed heterogeneity, suggesting some genetic difference in susceptibility within each of these plates. Variability in the transformation rate was frequently found between clones of cells from different plates.

65-822 STUDIES ON THE ONCOGENIC ACTIVITY OF THE POLYOMA VIRUS *IN VITRO* AND *IN VIVO*. III. MALIGNANT TRANSFORMATION OF HAMSTER HEART CELLS AS RESULT OF POLYOMA VIRUS INFECTION. (E.) Porwit-Bóbr, Z. (Dept. Med. Microbiol., Cracow Acad. Med., Poland), Z. Chłap, Z. Rokotowa and W. Jaszc. *Bull. Pol. Med. Sci. Hist.* 7(3):125-130, 1964.

A number of morphological observations were made on a cell line, designated SHP₀, obtained by infecting 3-5-day-old cell cultures of hamster myocardium with SE polyoma virus from serial passages (10² TCID) and subsequent passaging with trypsin soln. This cell line was observed for 10 mo. after transformation without showing any significant morphological alteration. Significant changes appeared in the nucleoli and nuclear chromatin, as compared with the original uninfected cells. One-day-old hamsters were inj. s.c. or i.p. with 0.03 ml of different dilutions of the virus from P₀ to P₆ passages. Undifferentiated sarcoma developed in the hearts of 8/15 litters, in 2 salivary gland tumors, and in 1 each, tumors of the kidney, lung and brain. The tumors appeared after a comparatively long interval (usually preceded by a hemorrhagic stage), usually not sooner than after 3 wk.

65-823 STUDIES ON THE ONCOGENIC ACTIVITY OF POLYOMA VIRUS *IN VITRO* AND *IN VIVO*. III. MALIGNANT TRANSFORMATION OF HAMSTER HEART CELLS AS RESULT OF POLYOMA VIRUS INFECTION. (E.) Porwit-Bóbr, Z. (Dept. Med. Microbiol., Cracow Acad. Med., Poland), Z. Chłap, Z. Rokitowa and W. Jaszc. *Acta Med. Pol.* 4(2):209-220, 1963.

See the preceding abstract.

65-824 CHROMOSOME BREAKAGE ASSOCIATED WITH VIRUSES AND DNA INHIBITORS. (E.)

Nichols, W. W. (S. Jersey Res. Found., Camden, N. J.), A. Levan and B. A. Kihlman. Pp. 255-271 in Cytogenetics of Cells in Culture. Symp. Int. Soc. Cell. Biol., Vol. 3. Harris, R. J. C. (Ed.). Academic Press, New York, 1964, 313 pp.

Types of chromosome breakage induced in tissue culture by viruses (Rous sarcoma tumor of rats; measles leukocytes of man) are compared with those induced by cytosine arabinoside (CA) and by deoxyadenosine (AdR) in peripheral WBC of man. The chemically induced breaks resemble, in form and distribution, those caused by the measles virus, but both differ from X-ray-induced chromosome breaks. Their number, and the non-random pattern of their distribution among the chromosomes, and their preferential localization along a given chromosome, are charted and analyzed. (See also CRA 1(5):#942, 1963.)

65-825 CHROMOSOME NUMBERS AND KARYOTYPES OF TWO RAT TUMOURS INDUCED BY ROUS SARCOMA VIRUS IN VITRO. (E.) Vrba, M. (Inst. Exp. Biol. Genet., Czech. Acad. Sci., Prague) and L. Donner. Folia Biol. (Praha) 10(5):373-380, 1964.

Rat tumor B-Mix, induced by Rous sarcoma virus in vitro and passaged in vitro for 214 days, showed a high degree of chromosomal stability, with a stem-line of $2n = 42$ in 72% of cells, little aneuploidy, few polyploid cells and very few mitotic anomalies. Another rat tumor, MR₅, similarly induced but transferred in newborn outbred Wistar rats, showed a pseudodiploid stem-line with wider aneuploid scatter (32 to 120 chromosomes), monosomy and trisomy and numerical fluctuation in identifiable chromosomes. There were many mitotic abnormalities (bridges, fragments, and multipolar spindles). Trisomy of the longest telocentric chromosome was the only constant feature. Possible relationship of karyotype with RSV infection, and significance of the constant trisomy are discussed.

65-826 INFECTION OF HUMAN AND SIMIAN TISSUE CULTURES WITH ROUS SARCOMA VIRUS. (E.)

Jensen, F. C. (Wistar Inst. Anat. Biol., Philadelphia, Pa.), A. J. Girardi, R. V. Gilden and H. Koprowski. Proc. Nat. Acad. Sci. USA 52(1):53-59, 1964.

In a study with human (H) and green monkey (M) kidney cultures, characteristic lesions were produced without cultivating the cells for a long time prior to infection with the Schmidt-Ruppin or Bryan strains of Rous sarcoma virus (RSV). As early as 9 days after exposure to RSV there was already an accumulation of vacuolated cells in H cultures. The lesions appeared sooner in cultures in which growth was arrested or "slowed down" than in those exposed to RSV during the phase of rapid proliferation. Transfer of cells by splitting the originally infected cultures

also seemed to accelerate the appearance of lesions in the RSV-infected H and M kidney cultures. The vacuolated cells observed in H cultures seemed to represent "transformed" fibroblasts characteristic for this tissue culture (TC) system. Foci similar to those appearing in M kidney epithelial cell monolayers infected with RSV have been observed with other mammalian TC systems. Tumors developed in chickens after they were inoc. with WGM-1 SR-1 cells, which had been grown with chicken fibroblasts. In cultures propagated without separation of the focus- or plaque-forming elements, new lesions occurred at each passage level 3-4 days after cell transfer, suggesting that a "transforming" agent was carried which could infect fresh cells at each subculture; the presence of latter could not be demonstrated either in chick embryo fibroblast cultures exposed to material from H and M kidney cultures or in chickens implanted with the RSV-exposed H and M kidney cells. The only direct imprint of virus infection in H and M cells was the complement-fixation antigen which was detected in M kidney cells maintained for as long as 8 mo.

65-827 A CARCINOGENIC STUDY OF VIRUS LEUKEMIA INFECTION IN SUCKLING MICE.

(Jap., Abstract) Ida, K., Y. Oba, A. Fukuhara and S. Morita. Nippon Shonika Gakkai Zasshi (Acta Paediat. Jap.) 68(8):667-668, 1964.

Moloney leukemic viruses (obtained by the ultracentrifugation method) admin. i.p. to Balb/c and JPD strain mice (newborn (?) and suckling) induced typical leukemia in 13/13, and 12/13 (92%), resp. after av. latent periods of 68 and 72 days. Administration of the virus to JPD strain newborn and suckling 4-14 day-old mice induced leukemia in 25/36 (72%), and 24/27 (89%), resp., after av. latent periods of 117 and 106 days. Control Balb/c (15) and JPD (20) strain mice given heat-treated viruses failed to develop leukemia. Electron microscopic studies disclosed the presence of viruses (85 mμ in diameter) in a specimen obtained from the thymus of a leukemic mouse. The viruses consisted of immature forms as well as mature forms; the latter contained nucleoids. Investigation of the offspring of 5 pairs of leukemic mice indicated that 17%-75% of the offspring developed leukemia after a latent period of 88-111 days. The possible route of virus transmission was thought to be through breast feeding.

65-828 IMMUNOLOGICAL STUDIES OF VIRUS-INDUCED TUMORS. (Jap.) Hiraki, K. (Dept. Int. Med., Okayama U. Sch. Med., Japan). Saishin Igaku (Mod. Med., Osaka) 19(2):506-511, 1964.

Immunological studies of the spleen and liver obtained from C58 mice with spontaneous leukemia, from those with lymphatic leukemia (OHS-LL; derived from serial transplants of a spontaneous leukemia) and from those with myeloid leukemia (OHS-ML; derived from serial transplants of OHS-LL) revealed

at in comparison with normal C58 mice, the leukemic mice possessed different antigens (assessed by a precipitation method). The leukemic mice also possessed specific antigens not found in normal mice (determined by the Ouchterlony technique and electrophoresis); in addition the OHS-LL and S-ML mice had a common antigen in the β -globulin fraction. When studied by the fluorescent antibody technique, in both methylcholanthrene-induced mouse leukemia and spontaneous C58 mouse leukemia, the leukemia cells were found to have their specific antigens in addition to antigens shared with normal mice. The spleen, liver and bone marrow of these leukemic mice possessed specific fluorescent grains (indicative of virus antigens) in the cytoplasm and intercellular space which were not found in normal mice. Human acute myeloid leukemia antibodies reacted most strongly specifically with normal as well as leukemic lymphocytes, moderately with young leukemic cells, did not react with monocytes and lymphocytes. In acute lymphatic leukemia antibodies reacted strongly and specifically with young leukemic cells in the lymphatic series and also specifically with lymphocytes. They did not react with neutrophils. (See also CRA 1(4):#670, 1963.)

829 FURTHER STUDIES ON RADIATION-INDUCED SENSITIVITY OF HAMSTER CELLS TO TRANSFORMATION BY POLYOMA VIRUS. (E.) Stoker, M. (Inst. Virol., U. Glasgow, Scotland). Virology 23:123-125, 1964.

13 BHK21 hamster cells were exposed to 3 doses of X-irradiation to a survival of 2.5%. The final population of cells was neither more resistant to X-ray nor more sensitive to transformation with the polyoma virus; however, it retained the usual enhanced sensitivity when exposed to further irradiation. The time relation between irradiation and infection was then studied. When irradiation was delayed for 24 hr. prior to infection, an increase in transformation frequency (similar to that found when cells were irradiated immediately prior to infection with polyoma virus) was noted in the surviving cells. Sensitivity to transformation remained high 2 days after irradiation, and became normal after 4 days. See also CRA 1(1):#116, 1963; ibid., 1(2):#1883, 1964.

830 FURTHER STUDIES OF THE IMMUNOLOGICAL PROPERTIES OF GROSS VIRUS-INDUCED LYMPHOMAS. (E.) Wahren, B. (Inst. Med. Cell Biol., Karolinska Inst., Stockholm, Sweden). Scand. J. Clin. Lab. Invest. Res. 24(5):906-914, 1964.

In continuation of the studies reported in CRA 1(6):#1164, 1963, with respect to antigenicity of Gross virus (GV)-induced lymphomas, it was found that GV homogenate (spleen, lymph nodes, thymus from one or several mice with primary leukemia) was less potent than living GHA, GNC,

and GHDA lymphoma cells. However, when concentrated fractions of the same homogenate were previously injected into C3H/BI or (C3H x C57BL)F1 mice, both cytotoxic sera and resistance against isogenic transplantation were provoked. Evidence was obtained that cellular constituents rather than virus in its pure form are responsible for the induction of specific cytotoxic antibodies and transplantation resistance. When cytotoxic sera were assayed for virus-neutralizing capacity against GHA lymphoma, no effect was found. In cross experiments, no serological relationships were detected between Gross and polyoma virus and Gross and polyoma tumor antigens.

65-831 CATTLE LEUCOSES AND THE HUMAN LYMPHADENOMAS. (E.) Aleksandrowicz, J. (3rd Clinic Intern. Dis., U. Cracow, Poland), A. Wolska and T. Szuperski. Sangre (Barc.) 9(1):1-4, 1964.

See CRA 2(6):#1125, 1964.

65-832 RAT VIRUS AND PERIODONTAL DISEASE. IV. THE AGED HAMSTER. (E.) Baer, P. N. (Nat. Inst. Dent. Res., Bethesda, Md.) and L. Kilham. Oral. Surg. 18(6):803-811, 1964.

In 12-18-month-old hamsters, inoculated intracerebrally when 5 days-old with a 1:10 dilution of rat virus preparation, odontogenic "tumors" occurred within the body of the mandible and about the apical portions of the incisors in the maxilla. No odontogenic growths occurred in any of the controls.

65-833 THE EFFECT OF A CHELATING AGENT ON THE DEVELOPMENT OF EXPERIMENTAL INFECTIONS BY VARIOUS VIRUSES AND ON THE DEVELOPMENT OF VARIOUS TUMORS: EHRLICH CARCINOMA AND ROUS SARCOMA. (Fr.) Balmus, G. (Inst. Inframicrobiol., Rumanian Acad. Sci., Bucharest) and I. Samuel. Rev. Path. Gen. 63(748):559-571, 1963.

A more extensive treatment of CRA 1(2):#260, 1963.

65-834 CHARACTERISTICS OF HUMAN ADENOVIRUS TYPE 12 INDUCED HAMSTER TUMOR CELLS IN TISSUE CULTURE. (E.) Kitamura, I. (Dept. Exp. Biol., Baylor U. Coll. Med., Houston, Tex.), G. Van Hoosier, Jr., L. Samper, G. Taylor and J. J. Trentin. Proc. Soc. Exp. Biol. Med. 116(3):563-568, 1964.

A hamster tumor induced by adenovirus type 12 (A-12) was serially propagated in tissue cultures, and the characteristics of the established tumor cell line (HT-1) are reported. The HT-1 cells were small; they had an epithelioid aspect and a rapid growth rate. These cells could be made to grow alternately as monolayers or as detached balls of cells depending on conditions of culture. Both

could be transplanted in weanling hamsters. The HT-1 cells were resistant to superinfection with A-12. No virus was detected in subcultures of tissue culture media or lysed HT-1 cells into HeLa cells and in mixed cultures of HT-1 and HeLa cells. Electron microscopy of HT-1 cells in passage 32 failed to reveal A-12 virus particles. Inoc. of newborn female hamsters with irradiated tumor cells did not induce any tumors.

65-835 INFECTION OF SUCKLING COTTONTAIL RABBITS WITH SHOPE'S FIBROMA VIRUS.

(E.) Yuill, T. M. (Dept. Veterin. Sci., U. Wisconsin, Madison) and R. P. Hanson. Proc. Soc. Exp. Biol. Med. 117(2):376-380, 1964.

In 6-day-old or younger cottontail rabbits (*Sylvilagus floridanus*) inoc. intradermally in the gluteal region with 320 domestic rabbit infectious doses of Shope's fibroma virus, mortality resulted in 6/7 cases. Very large tumors developed at the site of inoc. Older animals (9-42 day age group) uniformly survived infection with the same dose; tumors were smaller and the mean time to regression was 62.0 days. Virus was successfully isolated from kidney, spleen, liver, lung, brain, primary tumor and satellite tumor tissues of fatally infected animals, but was not found in blood or grossly normal skeletal or cardiac muscle. Suckling 6-day-old domestic rabbits (*Oryctolagus cuniculus*) inoc. by the same route and with the same dose of virus suffered a more acute, more rapidly fatal and much less proliferative disease. Even in older domestic rabbits, which uniformly survived the infection, tumors were consistently smaller than in cottontails and the mean time to regression was 28.1 days. The significance of these differences is discussed in relation to ecological factors.

65-836 PROPERTIES OF A LYMPHOCYTIC LEUKEMIA AGENT ISOLATED FROM Ha/ICR SWISS MICE.

(E.) Buffett, R. F. (Roswell Park Mem. Inst., Buffalo, N. Y.), J. T. Grace, Jr. and E. A. Mirand. Proc. Soc. Exp. Biol. Med. 116(2):293-297, 1964.

An agent which induces lymphocytic leukemia (LL) in approx. 80% of Swiss mice inoc. at birth with cell-free filtrates (CFF; 10% suspension of tissue homogenates from leukemic mice; 0.1 ml s.c.) was isolated from Ha/ICR Swiss mice. At the time of report the agent was in passage 14. The incidence and latency varied somewhat in different passages but most LL occurred between 3-6 mo. of age. Incidence was higher and latency shorter in females. Leukemia occurred spontaneously in < 1% (5/837) of untreated controls observed for 12-14 mo. Only 36/435 (8%) weanling Ha/ICR inoc. with 0.2 ml s.c. of CFF at 3-4 wk. of age developed LL at 26-47 wk. Newborn Rf mice were highly susceptible: 56/70 developed LL in 13-40 wk. while no LL occurred among 117 controls. In newborn Sprague-Dawley (S-D) rats, 10/59 (17%) developed LL at

15-46 wk. of age, while no LL was found among 16 untreated S-D controls over a period of 58 wk. CFF obtained from leukemic Rf mice and S-D rats induced LL in Ha/ICR mice. The agent was sensitive to heat but not to ether; some loss of infectivity occurred under all storage conditions. In all instances latency was extended. The agent could be neutralized by incub. with specific antiserum produced in rabbits.

65-837 GROWTH CHARACTERISTICS, VIRUS YIELD, AND INTERFERON ASSAY OF LEUKEMIC MOUSE SPLEEN TISSUE CULTURES. (E.) Sinkovics, J. G. (Dept. Med., U. Texas M. D. Anderson Hosp., Houston) and C. D. Howe. J. Infect. Dis. 114(4):359-372, 1964.

Cell-free supernatant fluids obtained from the spleens and lymph nodes of Balb/c and young adult Swiss mice bearing Moloney virus (MV)-induced or Rauscher virus (RV)-induced leukemia, caused development of these diseases when inoc. i.p. into isologous mice. Cultures of RV leukemia showed a gradual decrease in virus yield, and infected aging splenic cultures failed to show a persistence of leukemic stem cells. The leukemic lymphoid cells did, however, persist in MV leukemia splenic cultures. In tests using mouse embryo monolayers and vesicular stomatitis virus, a nonspecific nonsedimentable inhibitor was found in both types of the leukemic mouse tissue cultures. During serial passages of the RV in mixed tissue cultures of suckling Balb/c mouse spleen and thymus, an interferon-like inhibitor was noted in the supernatant fluid prepared from the second passage, and a low yield of virus was recovered from passage 7.

65-838 STUDIES ON THE BAI STRAIN A (AVIAN MYELOBLASTOSIS) VIRUS. I. PRODUCTION AND EXAMINATION OF POTENT VIRUS-SPECIFIC COMPLEMENT-FIXING ANTISERA. (E.) Eckert, E. A. (Max Planck Inst. Virus Res., Tubingen, Germany), R. Rott and W. Schäfer. Virology 24(3):426-433, 1964.

The avian myeloblastosis producing BAI strain A virus, disrupted by treatment with Tween-ether (TE) or sodium lauryl sulfate (SLS), was found to induce the production of a high titer complement-fixing antibody in rabbits. All reactions of the TE and SLS rabbit antibodies with normal chicken tissue antigens found on the surface of the virus particles could be eliminated. The antisera produced with TE and SLS split virus were shown to react specifically with the virus. Disrupted myeloblasts obtained from leukemic chickens contained high conc. of the virus specific antigen; however, the antigen was not detected on the surface of the intact cell. (See also the following abstract.)

STUDIES ON THE BAI STRAIN A (AVIAN MYELOBLASTOSIS) VIRUS. 2. SOME PROPERTIES OF VIRAL SPLIT PRODUCTS. (E.) Bert, E. A. (Max Planck Inst. Virus Res., Tübingen, Germany), R. Rott and W. Schäfer. *Virology* 24(3):434-440, 1964.

Study was made of some biological and physical properties of products obtained by Tween-ether and sodium lauryl sulfate (SLS) degradation of BAI strain A virus which were used to produce specific viral antibodies in rabbits (see preceding abstract). The TE-split virus was found to have a component with a sedimentation constant of approx. 3 S and a density in CsCl gradients of 1.26. Material obtained from the SLS-split virus had a similar sedimentation constant, but in CsCl gradients it was separated into 2 components having densities of 1.26 and 1.33. The antigenic specificities of the latter 2 components were found to differ. It is suggested that the 2 components may represent different subunits of the virus particle, comparable to those isolated from myxoviruses but there is no indication as to which viral structure they may be ascribed.

FURTHER STUDIES ON CATTLE LEUKEMIAS. RESULTS OF VERIFICATION OF HEMATOLOGIC CHANGES BY HISTOPATHOLOGIC METHODS. (Pol.) Sasandrowicz, J. (3rd Clin. Intern. Dis., Acad. Hospital, Cracow, Poland), Z. Chłap, A. Wolska, J. Zuperski and K. Kawecka. *Pol. Tyg. Lek.* 18(18):1844-1847, 1964.

of the paper reported as CRA 2(6):#1125,

ISOLATION OF VIRUSES FROM LEUKAEMIC PATIENTS. (E.) Grist, N. R. (Ruchill Hospital, Glasgow, Scotland) and R. J. Fallon. *Med. J.* 2:1263, 1964.

Isolates of an agent recovered from leukemic patients (previously reported in CRA 2(4):#720, 1964) were investigated with a view to carrying out an epidemiological survey of its prevalence and distribution. The results suggest that the agent is a mycoplasma, not a virus, they do not preclude the possibility that both are present. The ease with which this agent can be grown in readily available tissue cultures and in appropriate epidemiological media simplifies the further work in investigating its possible relevance to leukemia.

EXPERIMENTAL VIRAL LEUKAEMIA AS A RHYTHMIC GROWTH PROCESS. I. CYTODIFFERENTIATIVE STUDY OF THE CUMULATION OF LEUKEMIC CELLS IN BLOOD. (E.) Říman, J. (Inst. Pathol. Chem., Czech. Acad. Sci., Prague). *Folia (Praha)* 10(5):331-345, 1964.

viral myeloblastosis (AVM) was studied in

White Leghorn chicks aged 12-27 days which were inoc. i.v. with the BAI strain A virus at 24-30 hr. of age. An extreme accumulation of leukemic cells in chicks bearing AVM was characterized as a systemic growth process consisting of stages at which the cells doubled, and by recurring changes which took place in the mean cell volume. Progressive increases in mitotic activity occurred in successive growth periods. The wt. of the spleen fluctuated inversely with each leukemic cell growth period in the blood, and indicated an association between the growth process in the blood and changes at the hematopoietic organ level.

STUDIES ON MURINE AND HUMAN LEUKEMIA. (E.) Dalton, A. J. (NCI, Bethesda), J. B. Moloney, G. H. Porter, E. Frei and E. Mitchell. *Trans. Assn. Am. Physicians* 77:52-64, 1964.

See CRA 3(3):#509 and #515, 1965.

STUDIES ON PLASMA ENZYME CHANGES IN VIRUS INFECTIONS. (E.) Mahy, B. W. J. (Dept. Biochem., London Hosp. Med. Coll., England) and K. E. K. Rowson. Pp. 224-226 in *British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.*

Of several plasma enzyme levels studied up to 10 days after i.p. inoc. of Riley, Friend, polyoma or Moloney virus into mice, only Riley virus caused significant increases in the levels of lactic dehydrogenase, and phosphoglucose isomerase with a marked to slight increase in aspartate and alanine transaminase, resp.; Riley virus had no effect on alkaline phosphatase or aldolase levels.

PLASMA ENZYME LEVELS IN TUMOUR-BEARING MICE. (E.) Mahy, B. W. J. (Dept. Biochem., London Hosp. Med. Coll., England). Pp. 226-227 in *British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.*

When a suspension of leukemic cells obtained from BALB/c mice with Moloney leukemogenic virus-induced leukemia, free of Riley virus (RV), was inj. s.c. into 2 groups of BALB/c mice, 1 of which received RV i.p. immediately afterwards, there was a synergistic action of RV with the neoplastic cells on the plasma lactic dehydrogenase level; a similar effect occurred on the plasma phosphoglucose isomerase level. RV had no effect on the steady rise in plasma aldolase level in association with tumor growth. The levels of plasma aspartate or alanine transaminase and alkaline phosphatase increased as the tumors grew, while RV produced a simple additive increase in plasma aspartate transaminase, but had no significant effect on the other 2.

65-846 DIFFERENCES BETWEEN HIGHLY INBRED LINES OF CHICKENS IN THE RESPONSE TO ROUS SARCOMA VIRUS OF THE CHORIOALLANTOIC MEMBRANE AND OF EMBRYONIC CELLS IN TISSUE CULTURE. (E.)

Payne, L. N. (Houghton Poultry Res. Stat., Huntingdon, England) and P. M. Biggs. *Virology* 24(4):610-616, 1964.

The response of the Reaseheath I, C and R lines of White Leghorns and the W line of Cuckoo Leghorns to Rous sarcoma virus (RSV) was determined by use of chorioallantoic membrane and tissue culture titrations. Based on the av. estimated RSV titers (\log_{10} PFU/ml), the W line was approx. 3 x more resistant, and the C line 176 x more resistant, than the I line. When compared with fibroblasts of I grown *in vitro*, the estimated RSV titer (\log_{10} FFU/ml) was approx. 4.3 and 3.5 \log_{10} lower on the C and R cells, resp. The RSV could not be recovered from cells of the C and R lines, whereas recovery was possible in cells of the I line. In tests using Brown Leghorn embryo cells, to which either a resistance-inducing factor (RIF) or I, C and R cells were added, it was determined that RIF was not present in the I, C and R lines. Sensitivity to RSV was completely dominant over resistance when C and I cells were crossed. It was concluded that the differences in sensitivity to RSV between the lines were genetically determined and are a result of both cellular transformation and replication of RSV. (See also CRA 3(3):#525, 1965.)

65-847 STUDIES ON MOLONEY LEUKAEMOGENIC VIRUS (MLV). VIRUS TITRATION IN MICE. (E.)

Rowson, K. E. K., A. V. Gillespie and J. J. Harvey. Pp. 215-216 in *British Empire Cancer Campaign 1963*. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

Two methods of virus inoc. are presented: (1) newborn ICI/SPF (specific pathogen free) mice were inj. with serial 100-fold dilutions of a Moloney virus preparation (direct titration). (2) The pooled plasma and tissue homogenates from the direct titration groups were inj. into other groups of newborn mice (indirect titration). The percentage incidence of leukemia at 16 wk. for the direct and indirect titration methods for the following virus dilutions was: 10^{-1} , 27% and 56%; 10^{-3} , 29% and 74%; 10^{-5} or 10^{-7} , 0% and 0%, resp. The authors note that there is no evidence that the passage procedure had served any useful purpose and the test should be repeated with more closely spaced dilutions.

65-848 ASSAY FOR FRIEND LEUKEMIA VIRUS: RAPID QUANTITATIVE METHOD BASED ON ENUMERATION OF MACROSCOPIC SPLEEN FOCI IN MICE. (E.)

Axelrad, A. A. (Ontario Cancer Inst., Toronto, Canada) and R. A. Steeves. *Virology* 24(3):513-518, 1964.

An enumeration spleen foci response method for the assay of Friend leukemia virus in C3H/BI mice is described. Also C57BL/6J0ci mice were found at least 100x as resistant and Swiss (Sandoz) inbred mice more than 2x as susceptible as C3H/BI mice to the spleen focus-forming action of Friend virus.

65-849 CONGENITAL TRANSMISSION OF MOLONEY VIRUS IN MICE. (E.) Harvey, J. J.

Pp. 216-218 in *British Empire Cancer Campaign 1963*. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

When the development of Moloney leukemogenic virus (MLV) in the untreated progeny of virus-inoc. mice (called vertical transmission (VT)) was studied, the following results were obtained: no transmission through the male parent; no transmission of MLV during the prenatal period; no relationship of VT to interval between birth of litter and leukemia inoc. of the mother; no VT from females inoc. as adults; the possibility of the contagious spread of MLV through the urine. Previous reports have shown that VT of MLV have occurred in the female line only and predominantly via the milk. VT has been demonstrated in the outbred mouse strains of Schofield and ICI/SPF as well as in the inbred mouse strains of BALB/c, C3H/Gs and C57/Br and in CB albino rats.

65-850 EFFECTS OF DRUGS ON REPLICATION OF RILEY VIRUS. (E.) Rowson, K. E. K.

P. 223 in *British Empire Cancer Campaign 1963*. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

Mice were given inj. of cortisone (C; 2.5 mg ever 24 hr.) and Riley virus (RV) was inj. 48 hr. after the first dose of C. When plasma virus titers were determined 24 and 36 hr. later, there was no significant difference in titer between the C-treated and control mice. In mice inj. i.p. with 9,10-dimethyl-1,2-benzanthracene (DMBA; 0.4 mg in 1% gelatin-saline), followed 1 hr.-14 days later with an i.p. inj. of RV, there was no evidence that DMBA affected virus replication as measured 24 hr. after infection or the increase in plasma lactic dehydrogenase activity produced by the virus. (See also CRA 1(5):#920, 1963.)

65-851 MOLONEY VIRUS AND URETHANE.

(E., Abstract) Salaman, M. H. and J. J. Harvey. Pp. 218-219 in *British Empire Cancer Campaign 1963*. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

Infection of 2-3-day-old ICI/SPF mice with Moloney virus (MV) led to leukemia in 11/28 after 1 yr.; addition of urethan (U) in another group at wk. 3, 4 and 5 increased incidence to 19/28

and shortened the av. latent period from 30 to 26 wk. U alone induced leukemia in 12/32 with an av. latent period of 30 wk.

5-852 ATTEMPT TO ISOLATE A LEUKAEMOGENIC VIRUS FROM URETHANE-INDUCED LEUKAEMIA IN MICE. (E., Abstract) Salaman, M. H. pp. 220-221 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

5-853 ANTIGENIC STUDIES ON THE CELLS OF VIRUS-INDUCED MOUSE LEUKAEMIAS. (E., Abstract) Gillespie, A. V. and M. H. Salaman. Pp. 221-222 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

5-854 A CYLINDRICAL CORE SUGGESTING ROTATIONAL SYMMETRY IN THE PARTICLE OF SV40. (Abstract) Gaylord, W. H., Jr. (Yale U. Sch. Med., New Haven, Conn.). J. Cell Biol. 23(2): 1-10, 1964.

5-855 THE ISOLATION OF RAUSCHER MURINE LEUKEMIA VIRUS BY MEANS OF A CESIUM CHLORIDE DENSITY GRADIENT. (Fr.) Photini Chenaille (Inst. Microbiol., Saint-Louis Hosp., Paris), J.-P. Boiron and J. Bernard. C.R. Acad. Sci. Paris 258(11) (Group. 13): 3129-3132, 1964.

For more detailed account of material previously abstracted as CRA 2(7):#1311, 1964.

5-856 RILEY'S PLASMA LACTATE DEHYDROGENASE-ELEVATING VIRUS (RV) AND URETHANE. (Abstract) Rowson, K. E. K. P. 220 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

In addition of RV to urethan had no effect on leukemia incidence in ICI/SPF mice compared to urethan alone (23% of 40 and 22% of 41, resp.).

5-857 ISOLATION OF VIRUS FROM HUMAN LEUKEMIA. (E., Abstract) Murphy, W. H. (Dept. Microbiol., U. Michigan, Ann Arbor), D. Furtado and E. Plata. J.A.M.A. 188(5):439, 1964.

5-858 ASCITES TUMOURS FROM CELLS TRANSFORMED IN VITRO BY POLYOMA VIRUS. (Abstract) Sanders, F. K. (Med. Res. Council, Res. Unit, Carshalton, Surrey, England). Br. J. Cancer (Int. Congr. Ser.) (77):39, 1964.

See also abstract nos.: 652, 657, 659, 660, 667, 670, 675, 679, 682, 683, 688, 692, 694, 695, 699, 718, 724, 777

Cells from a clone of a continuous line of hamster kidney cells transformed by polyoma virus (BHK/C.13/T.6) were adapted to grow as ascites tumors in hamsters.

65-859 VIRUS PARTICLES IN HUMAN MYELOID LEUKEMIA CELLS. (Ger.) Graffi, A. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin), D. Bierwolf, L. Baumbach, H. Blankenhagel, R. Widmaier and A. Randt. Deutsch. Gesundh. 19(34):1576-1580, 1964.

Cultivated *in vitro* leukemic cells from 4 terminal cases of myeloid leukemia (2 men, 2 women; 44-72 yr.) showed particles 45-70 m μ in diameter predominantly in nuclei but also to some extent in the cytoplasm. These particles were identified as viruses and were found in almost 50% of leukemia cells in 1 man but in a smaller portion of leukemia cells in the remaining 3 pts. The particles in the cytoplasm often showed differentiation into a sheath membrane and nucleoid. In 8 cases of leukemia of other types, such particles could not be found. In an appended note, 8 more positive cases were reported in 30 adults with myeloid leukemia.

65-860 MULTIPLICATION OF POLYOMA VIRUS IN CELLS OF A CONTINUOUS HAMSTER LINE SUSCEPTIBLE TO TRANSFORMATION. (E.) Bourgaux, P. (Bact. Lab., U. Brussels, Belgium). Virology 24(1): 120-122, 1964.

Half confluent monolayers of BHK21 hamster fibroblasts were labeled with P32 48 hr. before being infected with polyoma virus (PV), and on day 4 after infection the cells were harvested and mixed with non-radioactive polyoma virus which acted as carrier and marker virus. Following extraction and purification of the virus from the pooled cells, the preparation was examined for the presence of radioactive material having the physical properties of PV. Treatment with DNase suggested the presence of a radioactive substance in the form of DNA which appeared as background upon equilibrium density gradient centrifugation; sucrose gradient centrifugation revealed a peak of radioactivity which sedimented in the position of the faster hemagglutinating component of PV. A portion (14%) of the total radioactivity could be adsorbed to and eluted from guinea pig red cells under the same conditions as PV hemagglutinin. Zone electrophoresis showed that 70% of the total radioactivity migrated at the speed of PV. It was not known if the production of viral material was related to viral antigen synthesis or to the process of transformation. (See also CRA 2(6):#1141, 1964.)

EPIDEMIOLOGY AND BIOMETRY

- 65-861 RELATIONSHIP OF SOME NOXAE TO THE ORIGIN AND DEVELOPMENT OF LARYNGEAL PRECANCEROSES. (Cz.) Rajner, V. (Dept. Otolaryng., County Hosp., Ostrava, Czech.). Cesk. Otolaryng. 13(4):229-232, 1964.

Among 70 pts. (62 men, 8 women; 20-70 yr. old) with laryngeal precanceroses (17 leukoplakias, 10 pachydermias, 7 papillomas, 12 chronic hypertrophic inflammations, 3 fibromas, 21 polyps), 28 had been exposed for an av. of 18 yr. to coal and silicon dust; 8 were exposed for an av. of 23 yr. to iron smelting conditions; 8 were exposed for an av. of 25 yr. to chemicals (sulfuric and hydrochloric acids, vapors of ammonia, anthracene, benzene, car lacquers, and chemicals used in purification of water); 5 were exposed for 8 yr. to the dusty environment of cement works; 7 were exposed for 28 yr. to engine smoke, dust, vapors and thermal fluctuations. A total of 56 pts. (80%) had worked under conditions harmful to the respiratory tract; 20 (28%) were office workers; 41 (58%) urban and 29 were rural inhabitants. A total of 48 pts. (68%) were cigarette smokers (10-40 per day for 15-50 yr.). Familial predisposition was found in 50% of pts. All pts. underwent excision (sometimes repeatedly) of the local changes, but malignant degeneration occurred in 4/17 pts. with leukoplakia, 3/12 with chronic hypertrophic inflammation, and in 1/7 with papillomas.

- 65-862 CANCER IN IOWA. (E.) Editorial. J. Iowa Med. Soc. 54(3):142-143, 1964.

For an av. death rate of 159.9/100,000 population in Iowa during 1962, there were 4,448 deaths from cancer (2,375 males and 2,073 females). The cancer death rate varied considerably from county to county (range: 108.1 to 294.7). These variations were attributed to differences in the age distribution among the counties (av. age of inhabitants of the above extreme rate counties = 29.1 and 40.1 yr., resp.). Deaths from cancer of the mouth and pharynx were > 3 times as common in men as in women. Gastric cancer was twice as frequent in men as in women. Cancer of the bowel caused more deaths among women than among men, but death from rectal cancer was more frequent in men. Deaths due to neoplasms of the respiratory tract occurred in 546 men and 103 women. Among women, there were 401 deaths from mammary cancer, 213 from uterine cancer, 144 from ovarian cancer, and 21 from other genital cancer. Prostatic carcinomas caused 304 deaths, and neoplasms of other male genitalia caused 16 deaths. Deaths from urinary tract cancer were twice as frequent in men as in women. Deaths from Hodgkin's disease, lymphoma, and myeloma were about evenly distributed among the sexes, but those from leukemia were somewhat more frequent in men.

- 65-863 BLOOD GROUPS IN PATIENTS WITH MULTIPLE CANCERS. (E.) Tsukada, Y. (Roswell Park Mem. Inst., Buffalo, N. Y.), R. H. Moore, I. D. J. Bross, J. W. Pickren and E. Cohen. Cancer 17(10):1229-1232, 1964.

The distribution of blood types was studied from autopsy data obtained from 310 white pts. with multiple primary cancers and was compared with that of pts. with matched single cancers, healthy individuals, and data from the literature. Except for the female multiple cancer group which showed a somewhat higher frequency of blood type A, no statistically significant differences were noted. Due to various factors, this evidence of increased frequency was considered equivocal. No difference was observed in the frequency of the Rh₀(D) factor.

- 65-864 A SEARCH FOR THE BURKITT LYMPHOMA IN TROPICAL CENTRAL AMERICA. (E.) Rowe, N. H. (Dept. Path., Washington U. Sch. Dent., St. Louis, Mo.) and C. M. Johnson. Brit. J. Cancer 18(2):228-232, 1964.

A study conducted among 100 Negro children aged 4-14 yr. and 159 Choco Indians living in Yaviza in the jungles of Darien in Central America failed to reveal any evidence of the Burkitt lymphoma syndrome. Similarly, examination of histopathological data collected from a wide sampling of pts. living in the tropical coastal jungles revealed no occurrence of the Burkitt lymphoma. Differences were noted between the age dispersion, anatomic sites of lesions and histology of the Central American lymphomas and leukemias and those in Africa. In Central American jungles, lymphosarcoma, reticulum cell sarcoma and Hodgkin's disease occurred at the age of 4-26 yr. (av. 14.6 yr.) at a male to female ratio of 13:2, while leukemia (mostly of the lymphatic type) usually occurred at the age of 9 mo.-15 yr. (av. 6.6 yr.) at a male to female ratio of 4:2. The evidence indicates that an as yet unidentified factor, in addition to geographical conditions described by Burkitt, may exert a critical regulation of the syndrome.

- 65-865 THE RELATION OF AGE TO THE INCIDENCE OF CANCER OF CERTAIN SITES. (E.) Little, C. C. Proc. Nat. Acad. Sci. USA 52(4):865-869, 1964.

Average rates of incidence per 100,000 during 1935-1951 are given for cancer of all sites in Connecticut white females arranged in 8 groups from 0-19, 20-29, etc. to 80+ yr. and for combined, similarly grouped, males and females in New York and Connecticut. Also, the serial (incidence of stated age group/incidence in

preceding age group) expressed as percent of increase for each age group is given for separate sites of cancer (rectum, lung, skin, and breast or prostate) for each sex. Actual incidence generally increased with increasing age throughout, but rates of increased incidence showed distinctive patterns according to site, age, and sex. Thus, considering separate sites, the degree of pressure toward tumorigenesis in the skin appeared to be relatively steady in both sexes, with serial ratios for males and females of 3.6 to 1.75 and 3.3 to 1.8, resp., for the seven age groups, reflecting a relatively steady reaction to continuing external stimuli. In prostatic cancer the serial ratios rose from 2.0 to a peak of 18.0 and then declined to 1.9; in mammary cancer serial ratios declined steadily from 16.7 to 1.3 through the 7 age groups, reflecting changing hormonal activity. For pulmonary and rectal cancer, the changes in rate increase indicated that factors other than external stimuli were of primary importance in tumorigenesis. Thus, the relationship of the rates of change of cancer incidence at different sites in successive age periods may provide suggestive information about the host's response to carcinogenic pressures of various types and origins.

5-866 PEPTIC ULCER WITH ISLET CELL TUMOR. A REAPPRAISAL. (E.) Huizenga, K. A. *Dept. Med., Mayo Clin., Rochester, Minn.*, I. M. Goodrick and W. H. J. Summerskill. *Am. Med.* 37(4):564-577, 1964.

136 pts. with islet cell tumors of the pancreas, peptic ulcers were noted in 9/11 (82%) with non-insulin-producing adenoma, 4/13 (31%) with non-insulin-producing carcinoma, 6/85 (7%) with insulin-producing adenoma, and 7/27 (26%) with insulin-producing carcinoma. Of the 26/136 pts. who had peptic ulcers, 14 also had parathyroid, thyroid, adrenal or pituitary tumors. A familial history of endocrine tumor or peptic ulcer was common in the 26 pts. with peptic ulcers and showed an incidence of 77% in pts. with non-insulin-producing islet cell adenoma and 33% in those with islet cell carcinoma. In an additional 2 pts. with parathyroid adenoma, peptic ulcer occurred in 12/16 (75%) of those who also had islet cell tumors of the pancreas, but only in 9% of 426 without concomitant islet cell tumor. Although primary islet cell carcinoma shows similar endocrine and gastric secretory characteristics, it is believed that in most cases, the Zollinger-Ellison syndrome probably represents the "gastrin-secreting" islet cell tumor component of familial glandular adenopathy.

5-867 THE CANCER RISK IN ULCERATIVE COLITIS. (E.) MacDougall, I. P. M. (Gordon *Dept. Med., London*). *Lancet* 2:655-658, 1964.

16-yr. follow-up of 637 pts. with ulcerative colitis who were initially free of cancer revealed

9/196 with total colitis to have developed cancer of the large intestine during this period. This incidence rate was 30 times greater than that expected for the general population. Of 237 pts. who had undergone colectomy but retained a portion of the rectum, rectal cancer occurred in 5, giving an incidence rate 25 times greater than the expected norm. Of the pts. with cancer, 9/14 were 40-55 yr. old, and 13/14 had a history of colitis for more than 10 yr. Cancer of the large intestine arose in only 1/291 pts. with colitis confined to the distal colon or rectum, and occurred in none of 137 pts. with colitis who showed normal X-ray and typical sigmoidoscopic findings. Based on these data, approx. 31% of all pts. with colitis affecting the entire intestine may be expected to die of cancer, which is a strong indication for prophylactic colectomy including excision of the rectum in these pts.

65-868 CIRCUMCISION AND CERVICAL CANCER. (E.) Eser, R. S. (Inst. Cancer, U. Istanbul, Turkey). *Brit. Med. J.* 2:1073-1074, 1964.

In reply to the article reported in CRA 3(1):#9, 1965, the author provides statistics collected between 1948 and 1962 on the incidence of cervical cancer in Turkey where 99% of the population is Moslem and 96% of the men are circumcised. Though it is believed that circumcision has a preventive effect on the occurrence of penile cancer, its effect on the occurrence of cervical cancer seems unlikely. The incidence of cervical cancer in relation to all epithelial cancers was 12.7% among Turkish Moslems compared to 12.0% among Turkish non-Moslem non-Jewish individuals and 9.0% among non-Moslems living outside or in unknown regions of Turkey. The markedly higher rate of incidence in Turkish Moslems when compared with that among Jewish women might be due to the younger age at which the former marry and bear children.

65-869 EPITHELIOMAS IN THE COURSE OF LUPUS VULGARIS. (Pol.) Konturkova, D. (Clin. Derm., Acad. Med. Cracow, Poland). *Przeegl. Derm.* 51(5):553-558, 1964.

Among 1144 pts. treated for lupus vulgaris in 1952-1961, 56 cases (4.8%) developed epitheliomas (prickle cell carcinoma in 89.3% and basal cell carcinoma in 10.7%). The av. duration of lupus before malignant degeneration was 28 yr. (those receiving X-ray and radium irradiation usually developed the epitheliomas 10 yr. sooner). The epitheliomas recurred in 21 pts. (37.6%) usually after 2 yr., but sometimes even after 13 yr. The recurrences were usually more malignant than the original tumors. Metastases to lymph nodes were found in only 14.2%, but never in cases of Stage I malignancy. Pts. treated by old physical methods (e.g., irradiation with Finsen's lamp, X-rays, diathermic coagulation, cauterization, excision, and corrosive ointments) were the most prone to malignancy.

- 65-870 THE ASSOCIATION OF SQUAMOUS CELL INTRAORAL AND PHARYNGEAL NEOPLASMS WITH ENVIRONMENTAL FACTORS AND SYSTEMIC DISEASES. (E., Abstract) Keller, A. Z. (Public Health Res. Inst. New York City, Inc., N. Y.) and M. Terris. J. Dent. Res. 43(5)(Suppl. 2):798-799, 1964.

A "Special Group" of cancers that included the tongue, mouth floor, mesopharynx, hypopharynx, and adjacent oral sites was denoted by the acronym SCIOPN. Over 700 males with SCIOPN and an equivalent number of control subjects were studied. Smoking was more frequent among cancer pts. by site groupings than among their matched controls. Cancer associated with liver cirrhosis was uncommon among Jews (due to low alcohol and tobacco consumption) in contrast to Catholics and Protestants. (for previous studies, see CRA 1(7):#1399, 1963.)

- 65-871 CANINE PERIANAL GLAND TUMORS. (E.) Nielsen, S. W. (Dept. Anim. Dis., U. Connecticut, Storrs) and J. Aftosis. J. Am. Vet. Med. Assn. 144(2):127-135, 1964.

A 12-yr. study of perianal gland tumors in 300 dogs revealed 85% to have occurred in males, indicating hormonal dependency. Tumor inhibition was noted in castrated or estrogen-treated males. One-third of all tumors were found in Cocker Spaniels, a frequency which was 2-3x higher than that in other breeds. About 66% of the tumor-bearing dogs were 8-12 yr. old, while none occurred in dogs less than 2 yr. old. Histological studies showed 9/300 tumors to be carcinomas (3/9 females; 2/3 spayed) with two dogs showing metastases to the sacral and sublumbar lymph nodes. Two tumors were classified as mixed; 1 was a carcinoma with an abundant chondroid stroma, and the other an adenoma with a loose myxofibrous stroma. The remaining 289 tumors were classified as benign adenomas. No significant differences in age, breed, sex or site incidence were noted between dogs in Connecticut and Ohio.

- 65-872 RESULTS OF THE COLLECTIVE MEDICAL EXAMINATION FOR CERVICAL CANCER CONDUCTED IN OUR CLINIC. (Jap.) Fujiu, T. (Dept. Obstet. Gynec., Yamaguchi Pref. Coll. Med., Japan), N. Harima and M. Nakano. Rinsho Fujinka Sanka (Clin. Gynec. Obstet., Tokyo) 18(7):542-546, 1964.

In a collective medical examination of pts. for carcinoma of the cervix conducted during the month of September in 1961, 1962, and 1963, a total of 1,649 Oriental females received an examination consisting of a cervical smear test, and occasionally, biopsy when indicated. As to age 45.4% were between 35-44 yr. Carcinoma of the cervix (all squamous cell carcinoma) was detected in 9 pts.; their av. age was 55.5 (39-73 yr.). Two patients had a family history of carcinoma in close relatives.

- 65-873 STATISTICS ON MALIGNANT LYMPHOMAS IN JAPAN AND PHASE MICROSCOPY MALIGNANT LYMPHOMA CELLS. (Jap.) Wakisaka, K. (Dept. Intern. Med., Kyoto U. Sch. Med., Japan). Saishin Igaku (Mod. Med., Osaka) 19(7):1799-1813, 1964.

A survey of mortality due to primary malignant neoplasms of the lymphatic tissue (including lymphosarcoma, reticulosarcoma, Hodgkin's disease and from leukemias) conducted in Japan during 1950-60 indicated that all death rates showed a steady increase although the rates were not as high as those of other major nations in the world. In all age groups, the latter statement was valid in the case of the death rates from lymphosarcoma and other neoplasms of lymphatic and hematopoietic tissues. There were some differences in death rates from lymphosarcoma and reticulosarcoma in various geographic areas in Japan, but these were not particularly impressive. Some phase microscopic differences in cells of various human acute and chronic leukemias, lymphosarcoma and other reticuloses are also reported.

- 65-874 AN ADDITIONAL COMMENT TO THE PAPER PRESENTED BY K. WAKISAKA. (Jap.) Kimura, K. (Nat. Cancer Ctr. Hosp., Tokyo, Japan). Saishin Igaku (Mod. Med., Osaka) 19(7):1828-1831, 1964.

In an analysis of a total of 2,188 cases of malignant neoplasms of the lymph nodes collected from all over Japan, reticulosarcoma (RS) represented 53.4%; Hodgkin's disease, 21.0%; lymphosarcoma, 14.3%; lymphatic leukemia 7.1%; malignant lymphoma, 2.4%; and follicular lymphoblastoma, 1.7%. The incidence of RS was higher than that reported by other nations, while that of lymphosarcoma was lower. The male:female ratios were 2.0:1 for RS, 2.6:1 for Hodgkin's disease, 1.8:1 for lymphosarcoma, and 1.9:1 for follicular lymphoblastoma. The incidences of RS and Hodgkin's disease were highest in the 50-60-yr. age group and that of lymphosarcoma in the age group of 55-65 yr.

- 65-875 A COLLECTIVE PHOTOFLUOROSCOPIC SURVEY OF THE STOMACH IN IWATE PREFECTURE. (Jap., Abstract) Ashizawa, M. (Dept. Radiol., Iwate Coll. Med., Japan), H. Otake, Y. Iwasaki, M. Sasaki, T. Ashizawa, and K. Sugawara. Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 23(4):459-460, 1963.

In a mass screening survey of the stomach, among a total of 4,276 individuals examined during the period from October 1959 to the present, carcinoma of the stomach was detected in 5 individuals, which represented 0.12% of the entire group or 0.16% of those over 40 yr. of age.

- 65-876 A TWO-YEAR STUDY OF POST-CRICOID CARCINOMA IN IRAQ. (E.) Ovanessoff, S.

Dept. Ear-Nose-Throat, U. Baghdad Coll. Med., Iraq). J. Fac. Med. Baghdad 6(4):121-127, 1964.

The pathology, signs and symptoms of post-cricoid carcinoma are briefly described (23 references). During 1962-63 at the Jumhoorya Hosp. in Baghdad, 9 cases (8 men and 11 women; age 17-55 yr.) were observed, but no correlation with occupation, social class, habits, diet, race or heredity was seen. A regional relationship is implied in that only 2 pts. were from the north of Baghdad, whereas the majority were from areas south of the city.

65-877 ASBESTOS DUST EXPOSURE AND MALIGNANCY. (E.) Wagner, J. C. (Llandough Hosp., Penarth, S. Wales, Great Britain). Excerpta Med. (Int. Congr. Ser. #62) 3:1066-1067, 1964.

Of 122 cases of histologically confirmed diffuse mesotheliomas of the pleura recorded in S. Africa since 1956, 119 were exposed to crocidolite (blue) asbestos (110 in the Cape asbestos mine fields, in industry); 1 was exposed to chrysotile asbestos; 2 had no history of exposure to asbestos. In some, primary peritoneal tumors were also observed. An apparent environmental association was indicated in that more than 50% had never worked in the mines or mills but lived in their vicinity, and no correlation existed between the severity of asbestosis and the presence of tumor in the occupational group. The av. period of exposure to asbestos dust before occurrence of tumor was 40 yr. Other investigators have reported the presence of oils containing polycyclic hydrocarbons, including 3,4-benzpyrene, which occur in greater concentration in crocidolite than amosite asbestos. Preliminary investigations in Great Britain have shown that of 161 histologically confirmed cases of diffuse mesotheliomas of the pleura and/or peritoneum, 68 were exposed to asbestos dust.

65-878 THE ASSOCIATION OF CERTAIN CANCERS WITH ASBESTOSIS. (E.) Buchanan, W. D. (St. James' Sq., London). Excerpta Med. (Int. Congr. Ser. #62) 2:617-619, 1964.

Studies conducted in Great Britain during the yrs. 1914-1930, 1931-1940, 1941-1950, 1951-1960 and 1961-1962 revealed that lung cancer associated with asbestosis developed in 0/13 (0%), 12/66 (18.2%), 20/92 (21.8%), 45/144 (31.3%) and 22/49 (44.9%) males, resp., and in 0/7, 5/82 (6.1%), 15/55 (27.3%), 11/40 (27.5%) and 2/11 (18.2%) females, resp. By comparison, mortality rates for thoracic cancers among the general population during 1961 were 7.4% for males and 1.3% for females. Of the total 549 cases of asbestosis, the incidence of cancer in organs other than lung and bronchus was: stomach, 5; intestine, 6; bladder, 1; testis, 1; abdomen and ovary, 8; and pleura or mesothelioma, 9. Malignant peritonitis was noted in one case. Four of the 9 cases of mesotheliomas of the pleura were detected in 1961. The major types of asbestos fiber used in Great

Britain are chrysotile, crocidolite and amosite. It is possible that a common carcinogen exists in all types.

65-879 SKIN DISEASES IN IRAN. (E.) Mehregan, A. H. (Dept. Derm., Wayne State U. Coll. Med., Detroit, Mich.). Dermatologica (Basel) 129(4):349-358, 1964.

In a statistical study of 1500 cases of skin disease in Iran, 54 malignancies or premalignancies are reported, including basal cell epithelioma (11), verruca vulgaris (11), squamous cell carcinoma (10), pigmented nevus (8), malignant melanoma (1) and leiomyoma (1). A large malignant melanoma of the cheek occurred in an 8-year-old boy with advanced xeroderma pigmentosum. Benign or malignant tumors comprised less than 5% of the skin diseases.

65-880 GASTRIC STUMP CARCINOMA. (Ger.) Moldenhauer, W. (Clin. Med., U. Rostock, Germany) and W. Kröger. Zschr. Ges. Inn. Med. 19(21):804-808, 1964.

Among 216 men and 140 women with gastric carcinoma, 9 cases consisted of gastric stump carcinoma (8 men, 1 woman; 58-73 yr. old). There was an interval of at least 5 yr. between surgery for a non-tumorous disease and the appearance of the stump carcinoma. The incidence of gastric stump carcinoma was tabulated from the literature (81 references) and found to be somewhat more frequent in those resected due to gastric ulcer than in those resected due to duodenal ulcer. There was no relationship to the method of operation. In comparison to pts. with ulcer who had no gastric resection, this surgery does not seem to predispose to cancer.

65-881 GASTRIC BIOPSY IN PATIENTS AFTER STOMACH RESECTION DUE TO ULCERATIVE DISEASE. (Ger.) Hradský, M. (1st Clin. Med., Charles U. Sch. Med., Hradec Kralove, Czech.), V. Kalista and V. Herout. Zschr. Ges. Inn. Med. 19(21):801-804, 1964.

A total of 77 pts. (57 men, 20 women; aged 28-70, av. 52 yr.) were investigated by biopsy chiefly 1-3 yr. after gastric resection due to ulcerative disease. Chronic gastritis was found in 71 (92.2%). Metaplasia of gastric mucosa was found in 21 (27.3%). Among 28 pts. investigated for gastritis at time of surgery, 10 had normal gastric mucosa, but 8/10 developed gastritis within 3 yr. after surgery. There were no pts. with gastritis at surgery who later showed normal mucosa. The high incidence of gastritis in the stomach stump may have a relationship to the high incidence of stomach stump-carcinoma. Among 450 gastric carcinoma pts. operated upon within 7 yr. (1959-1962), 6 pts. (1.3%) had gastric stump carcinoma after previous resection due to gastric (6) and duodenal (2) ulcer. The time interval between resection and

development of stump cancer was 11-27 yr. (av. 18.9 yr.).

- 65-882 SURGERY FOR GASTRIC CARCINOMA AND THE POSTOPERATIVE RECURRENCE AT THE STUMP. (Ger.) Colombo, O. (Dept. Surg., State Hosp., Leoben, Austria). Zbl. Chir. 89(40):1485-1487, 1964.

Among 314 cases of gastric cancer (192 men, 122 women), 152 underwent resection (106 radical, 46 partial). Recurrences within 5 yr. occurred in 5/51 adenocarcinomas, 3/26 cirrhotic carcinomas, 3/39 solid carcinomas, 1/19 colloid carcinoma, and 0/17 ulcer carcinoma. Among the 12 recurrences, 5 had had radical surgery and 7 had had conservative surgery. It was concluded that local recurrence is rather rare.

- 65-883 NEOPLASMS OF THE FEMALE GENITAL SYSTEM AND BLOOD GROUPS. (Pol.) Kozaczenco, J. (Dept. Obstet. Gynec., 2nd Cent. Hosp. Clin., Warsaw Acad. Med., Poland). Pol. Tyg. Lek. 19(46):1764-1766, 1964.

No statistically significant relationship was found between the ABO blood groups and the incidence of female genital tumors among 567 pts. (aged 17-57 yr.).

- 65-884 ANALYSIS OF MORBIDITY AND THE CLINICAL PICTURE OF LEUKEMIA IN CHILDREN IN THE YEARS 1949-1961. (Pol.) Majewska, M. (2nd Clin. Pediat., Acad. Med. Lublin, Poland), U. Miazek, H. Staszewska, E. Tuskiewicz and H. Wasak. Pol. Tyg. Lek. 19(47):1813-1815, 1964.

Among a total of 75,454 clinical admissions to the Pediatric Clinic of the Lublin Medical Academy, there were 145 cases of leukemia. A trend towards increased morbidity was noted (17 cases in 1949-1951; 36 cases in 1953-1955; 46 cases in 1956-1958; 46 cases in 1959-1961). The incidence of leukemia was higher in males (60.6%) than in females; 71% of the children with leukemia were from rural areas. Morbidity was most frequent at the age 3-6 yr. (61/145, 42%); 8/145 were infants up to 1 yr. old.

- 65-885 LEUKEMIAS, HODGKIN'S DISEASE AND MALIGNANT NEOPLASMS IN THE DECADE OF 1953-1962 IN THE LUBLIN CENTER. (Pol.) Bednarzewski, J. (1st Clin. Intern. Dis., Acad. Med. Lublin, Poland) and A. Gutka. Pol. Tyg. Lek. 19(46):1769-1771, 1964.

No increase in incidence of malignancies was found during the decade studied, except for a transient increase in acute leukemia during 1958-1960. A total of 26,878 cases (12,479 men and 14,399 women) in the Lublin center was observed. Acute leukemias occurred predominantly below the age of 30 and chronic leukemias above 30.

- 65-886 THE ASSOCIATION OF CANCER OF THE UTERINE CERVIX AND TOTAL PROLAPSE IN EL SALVADOR. (Sp.) Diaz-Bazan, N. (Dept. Diag., Rosales Hosp., San Salvador, El Salvador). Acta Oncol. (Madrid) 11(2):209-230, 1963.

In the republic of El Salvador among 1,318 cases of cancer of the uterine cervix observed at the country's largest general hospital (Hospital Rosales) during the period 1950-1957, 25 (2%) were associated with total prolapse of the uterus. The incidence of this association appears to be very high in comparison with that reported by other investigators (0.1%). The highest frequency was observed in the 40-49 and 50-59 yr. age groups with 28% each; pts. in the 30-39 yr. age group accounted for 12% of this association. The majority (80%) of the pts. were multiparous (4-16 deliveries/pt.). Histologically, the tumors were spinocellular carcinomas in 56% of the cases. Possible etiological factors are discussed with the conclusion that prolapse does not protect against uterine carcinoma. A review of the literature (61 references) is also presented. (See also CRA 2(3):#541, 1964.)

- 65-887 SEASONAL ONSET OF ACUTE LEUKAEMIA. (E.) Allan, T. M. (Roy. Infirmary, Aberdeen, Scotland). Brit. Med. J. 2:630, 1964.

A winter peak of clinical onset was invariably seen in 7 series of acute leukemia cases (both children and adult) reported by other authors to date. Most of the evidence, whether direct or circumstantial, suggests that these peaks have been largely due to adult cases. It remains to be seen whether similar peaks will prove to be the rule in future series.

- 65-888 SOME PROBLEMS OF LUNG CANCER. (E.) Lombard, H. L. (New Eng. Deaconess Hosp., Boston, Mass.). Lancet 2:691, 1964.

In an appraisal and discussion of a previous report by R. D. Passey on lung cancer, the author presents some of his own collected data. The av. number of cigarettes smoked in relation to the age at onset of lung cancer (male) was greater in the author's series, although the general distribution by age was similar. Duration of smoking habit in relation to age at onset of lung cancer (male) was reasonably close in both reports, the data showing that those who began to smoke early developed lung cancer earlier than those who started late. In 2 samples, each of 400 smokers and separated by about 10 yr. (1950-54 and 1960-63), a survey of the av. age by definite amount of cigarettes smoked revealed that non-smokers of cigarettes had the highest av. age, moderate smokers the lowest, and very heavy smokers had higher ages, although less than non-smokers. In the author's opinion, this does not support Passey's hypothesis, but is not inconsistent with the view that lung cancer is caused by varying

degrees of host susceptibility, usually activated by cigarette smoking. About 20% of the pts. in the series reported that they had chronic respiratory disease. In the 1960-63 group, the ages were higher for all categories than the 1950-54 group. Subdividing the data into 4 calendar periods (1948-63), there was an upward trend for lung cancers in males, greater than for total deaths in Massachusetts. In females, however, the lung-cancer trend was less than that for all causes. The author prefers to use a control population matched for age with the cancers.

889 ACTUARIAL METHODS OF MORTALITY ANALYSIS; ADAPTATION TO CHANGES IN THE AGE AND CAUSE PATTERN. (E.) Benjamin, B. *Proc. Roy. Soc. London (Ser. B)* 159:38-65, 1964.

In a discussion meeting, R. E. Beard presents an extensive statistical model for lung cancer deaths. Results provide a possible explanation of the known discrepancy between male and female mortality from lung cancer. A separation of the types of cancer is an important statistical exercise. There is considerable support that the use of the cigarette is that of an agent which consistently damages the tissues in such a way that when the damage reaches a certain critical level lung cancer can develop rapidly.

890 COLLECTIVE MEDICAL CHECK FOR MALIGNANT FEMALE GENITAL TUMORS CONDUCTED IN THE CHUGYO-NUMA AREAS. (Jap.) Ichinomiya, K. (Dept. Obstet. Gynec., Tokyo Med. Dent. Coll., Japan), Nakai, and T. Takama. *Rinsho Fujinka Sanka J. Gynec. Obstet., Tokyo* 18(7):540-541, 1964.

In a routine survey, among a total of 567 Oriental females of the Chugyo-numa areas in Niigata Prefecture, aged 21-68 yr., examined for malignant female genital tumors, 3 cases of carcinoma of the cervix were detected.

891 A SURVEY ON THE PREVALENCE RATE OF CARCINOMA OF THE ESOPHAGUS IN NORTH CHINA. (E.) Li, K.-H. (Chinese Acad. Med. Sci., Beijing), J.-C. Kao and Y.-K. Wu. *Acta Un. Int. Cancer* 20(3):629-631, 1964.

In the regions surveyed (population, 17,077,769) in North China during 1959-60, there were 1,831 cases of esophageal carcinoma to give a rate (per 100,000) of 7.11. The highest rate (67.26) occurred in Lin Hsien of Honan province and the lowest (0.32) in the Yent'ai district of Shantung province. The rate was higher in the rural and mountainous areas than in the cities. The pts. in the 50-69 yr. age groups comprised 66.14% of the entire group. The male:female sex ratio was 2.7. Year-incidence rates were 95.8/100,000 (Lin Hsien) and 38.6/100,000 (Yangch'üan of Shansi province). The mortality rate was usually higher than the prevalence rate for the same region.

Incidence of positive family history for esophageal carcinoma varied from 24%-61.4%, and was definitely higher than that of controls. The incidence of alcohol "drinking" varied from 28.8%-45.1%. In Feich'eng, where the prevalence rate was highest for the province (Shantung), the incidence of drinking was lower (28.8%) than that for the whole province (45.1%). In Lin Hsien, where the prevalence rate was the highest, there was practically no drinking. It appears that the drinking habit is not an important etiological factor in esophageal cancer.

65-892 THE EVOLUTION OF THE MORTALITY FROM BREAST AND UTERINE CANCER IN ITALY. (E.) Pandolfi, A. (Nat. Cancer Inst., Milan, Italy). *Acta Un. Int. Cancer* 20(3):632-633, 1964.

In Italy, the mortality rates from all tumors, mammary cancer and uterine cancer were as follows: 78.84, 9.52 and 13.08, resp., in 1933; 88.54, 11.58 and 14.69, resp., in 1940; 127.13, 17.93 and 17.09, resp., in 1957. With mortality rates arbitrarily fixed at 100 for 1933, ratios for succeeding years were as follows: 112.6, 121.61 and 112.3, resp., in 1940; 161.2, 188.3 and 130.7, resp., in 1957. Mortality from mammary cancer was higher in the North than in the South, whereas the reverse was seen for uterine cancer. The birth rate is smaller in the North.

65-893 CARCINOMA CERVIX UTERI: A GEOGRAPHICAL SURVEY STUDY. (E.) Thomson, A. D. (Bland-Sutton Inst. Path., Middlesex Hosp., London, W.1). *Acta Un. Int. Cancer* 20(3):634-637, 1964.

In a survey conducted in 1957-58, the incidences (per 100,000) of carcinoma of the uterine cervix in the S.W. Region of England was 16 compared to 24 in Connecticut. A review of the histological material by an English and an American pathologist confirmed the statistical differences in the two geographic areas.

65-894 GYNECOLOGIC MALIGNANCY REGISTRATION IN NANKING AREA. A 5.5-YEAR STATISTICAL SURVEY. (E.) Liu, B.-L. (Dept. Obstet. Gynec., People's Drum Tower Hosp., Nanking, China) and C.-Y. T'ien. *Chin. Med. J.* 83(3):171-175, 1964.

In the Nanking area, among 1,419 cases of gynecologic malignancy registered from 1957-62, were: cervical carcinoma, 1,268 (89.36%); ovarian, 67 (4.72%); choriocarcinoma, 23 (1.62%); malignant mole, 10 (0.71%); corpus, 27 (1.90%); vulva, 15 (1.06%); vagina, 8 (0.56%); oviduct, 1 (0.07%). An increase in incidence of cervical carcinoma during the last few yr. is probably due to mass screening (vaginal smear). As to age, 69.5% of those with uterine cervical carcinoma were 35-54 yr. The av. age of pts. with intraepithelial carcinoma was 39.8 and of those with invasive

cancer was 47.4. Where records were available, it was shown that 633/886 (71.54%) of those with cervical cancer were married before 20 yr., compared to 34.7% of controls. With respect to parity (records unavailable in 35 cases), 56 were nulliparous, 13 had a history of abortion only, and the rest had 1-16 births, the majority having 1-7 births as did controls. Only 27 cases of corpus carcinomas were registered, occurring at an av. age of 53.5 yr. Of 67 cases of malignant ovarian tumors, more frequently encountered were serous papillary cystadenocarcinoma (25), pseudomucinous cystadenocarcinoma (11), and granulosa cell tumor (9); more than 50% of these pts. were < 45 yr. The ratio of choriocarcinoma (av. age, 28.87 yr.) was 1:21,957 live births; that of malignant mole (av. age, 34.4 yr.) was 1:43,914 live births. Five of 23 cases of choriocarcinoma were preceded by hydatidiform mole.

- 65-895 WHAT ARE THE ESSENTIAL CRITERIA FOR ASSESSMENT OF GEOGRAPHIC INFLUENCES WHICH MAY MODIFY THE UNIVERSAL PROSTATIC HYPERPLASIA AND NEOPLASIA? (E.) Hearst, B. R. (Bertha Hearst Res. Found., Chicago, Ill.). Acta Un. Int. Cancr. 20(3):642-644, 1964.

In a preliminary study to determine whether geographic influences modify prostatic hyperplasia and neoplasia, it is stated that the Mayan Indians (Yucatan Peninsula) seem to develop the prostate later and stop developing it earlier than North Americans. In North America, surgical prostatic malignancy is first noted, apparently, in the 30-39-yr. old group and continues into the 80-89-yr. group, whereas in Yucatan it is first noted in the 50-59 yr. group and last noted in the 70-79 yr. group. Valid criteria are suggested, including general body conditions, as possible means to information concerning prostatic neoplasia and hyperplasia.

- 65-896 PRIMARY CARCINOMA OF THE LUNG IN THE BANTU. (E.) Hurwitz, C. (P.O.B. 5765, Johannesburg, So. Afr.). Acta Un. Int. Cancr. 20(3):648-651, 1964.

For the past 11 yr. in Johannesburg the number of deaths from primary lung cancer was 5x greater in Europeans than in the Bantu. In Johannesburg (1960 population, 375,000 Europeans and 522,000 Bantu) where miners and non-miners are checked radiologically, primary lung cancer incidence in those under 35 yr. of age was 15 Bantu and 4 Europeans. As a possible etiologic agent, it is stated that from childhood on, the Bantus inhale a great deal of smoke from braziers. Many cases of the common primary liver cancer in the Bantu are diagnosed on routine mass miniature X-rays of the chest.

- 65-897 RENAL TUMOURS IN NIGERIA. (E.) Davey, W. W. (Dept. Surg., U. Ibadan, Nigeria). Brit. J. Urol. 36(3):340-346, 1964.

Twenty cases (both sexes; 4 mo.-60 yr. old) of renal tumors were seen at the Univ. of Ibadan, Nigeria, from 1957-63, including 9 adenocarcinomas, 9 nephroblastomas (1/9 bilateral), 1 embryoma (adult) and 1 secondary neoplasm probably of pancreatic origin. It is concluded that the clinical features are similar to those elsewhere. Nephroblastoma compared with adenocarcinoma is commoner than in Europe. This would appear to be due to the high proportion of children and low proportion of elderly people in the African population. Burkitt's tumor is the commonest renal neoplasm in tropical Africa.

- 65-898 THE ETIOLOGY OF PULMONARY CANCER FROM THE POINT OF VIEW OF COMPARATIVE PATHOLOGY. (Fr.) Lombard, C. (Lab. Path. Anat. Nat. Vet. Sch., Toulouse, France). Bull. Acad. Nat. Med. (Paris) 148(23-24):488-492, 1964.

Among domesticated mammals the highest incidence of pulmonary cancer is observed in dogs and cats. The frequency of this condition has increased in the recent yr. Among 14,396 dogs which were autopsied at the Veterinary School of Toulouse from 1931 to 1963, lung cancer percentage remained practically insignificant up to 1954 and then began to increase gradually with values of 0.42, 0.47, 0.52, 0.56, 1.17 and 1.79%, resp., in 1955, 1959, 1960, 1961, 1962 and 1963. During the same period in autopsies on 5,006 cats, pulmonary cancer was almost unknown until 1958; its incidence rose to 1.56% in 1959 and thereafter ranged from 0.55% to 0.68% in the period up to 1963. After discussing various etiological factors, such as chemical and physical carcinogenic agents, viruses and heredity, the author concludes that atmospheric pollution is most likely to be responsible for this increase.

- 65-899 ON THE STUDY OF GEOGRAPHICAL PECULIARITIES OF CANCER SPREADING IN KASSR. (E.) Dvoirin, V. V. (State Oncol. Disp. Petrozavodsk, KASSR). Acta Un. Int. Cancr. 20(3):613-615, 1964.

In a study of cancer in Karelia for the yr. 1958-60, the number of malignancies (per 100,000) was 80.9 for males (M) and 124.3 for females (F). The number of cancer cases (both sexes) increased from North to South, and was greater among F < 40 yr. because of mammary and uterine carcinoma. A high direct correlation was seen between stomach cancer and skin cancer cases. The number of cancer cases (per 100,000) was: lip, 7.5 (M) and 1.2 (F); esophagus, 8.2 (M) and 10.9 (F); stomach, 32.1 (M) and 36.4 (F). Cancer was more frequent in the South and in townspeople and less frequent in Russians. There was a small direct correlation between SI (comparative number of cancer cases by 5 and 10 yr. age groupings) of stomach and esophageal carcinoma cases. In F the incidence of mammary carcinoma cases was 8.1, cervix carcinoma 23.6; the former occurred more often in the South. Cervix carcinoma occurred more often in parous townspeople. Mammary and cervix carcinoma occurred

x and 1.4x, resp., more often in Russians. There was a high direct correlation between the incidence of mammary and cervix carcinoma among parous F and a high, reverse correlation among nulliparous F. Lung cancer cases (12.5 M and 2.2 F) occurred more often in the North and in towns, less often among Russians. Larynx carcinoma (2.8 M, 0.3 F) occurred more often in the South and in townspeople and was less frequent in Russians. The correlation of SI of larynx and lung cancer, resp., was 100:460 (M) and 100:1000 (F).

5-900 ABNORMALITIES ACCOMPANYING CARCINOMAS OF THE LARGE INTESTINE. (E.) Sommers, C. (Columbia U. Coll. Phys. Surg., New York, N.Y.). Dis. Colon Rectum 7(4):262-269, 1964.

Post and tumor relationships were studied in records of autopsies on 439 pts. (258 men, 181 women; age 20-95 yr.; 70% > 60 yr.) with colon carcinoma (of which 30/439 had multiple primary colon cancers) and compared to unmatched and matched non-cancer controls. In the cancer group, 10/241 were judged obese compared to 102/355 in the non-cancer group. Pathologic features of the entire colonic cancer group differed significantly from controls: colonic adenomatous polyps occurred in 85/439 cancer pts. and in 31/439 controls; pancreatic islet hyperplasia in 101/427 cancer pts. and in 45/395 controls; adrenal cortical hyperplasia and adenoma together in 45/411 cancer pts. and in 24/414 controls. Benign prostatic hypertrophy occurred in 87/255 men with colon cancer and in 115/216 male controls. Ovarian adenofibroma was found in 9/121 women with cancer and in 2/138 without cancer. Pancreatic mucinous metaplasia occurred in 11/176 pts. with cancer compared to 3/172 controls. Sixty per cent of colonic carcinomas occurred in the sigmoid, cecum or rectum, where the feces ordinarily are solid.

901 A PRELIMINARY SURVEY OF ABO BLOOD GROUP FREQUENCY IN NASOPHARYNGEAL CARCINOMA IN CHINESE PATIENTS. (E.) Seow, L. J., S. B. and C. K. Teoh. Singapore Med. J. 5(3):93-95, 1964.

Significant differences could be detected in the ABO blood group distribution among 232 nasopharyngeal carcinoma of Chinese pts. and the ABO distribution among the Chinese population of Singapore.

902 AIR POLLUTION IN JAPAN. (E.) Sakabe, H. (Nat. Inst. Indust. Health, Kawasaki, Japan). Proc. Roy. Soc. Med. 57(10)(Pt. 2): 5-1012, 1964.

Japan during 1958-59, in relation to all cancer deaths, mortality due to the following cancers was: stomach, 52.8%; hepatic and biliary

tract, 11.0%; lung cancer, 6.5%. Recently, lung cancer has shown a sharp increase. A close correlation between air pollution and lung cancer has not been demonstrated in Japan. Methods and results of measurements of air pollution are reviewed (24 references).

65-903 MALIGNANCIES IN AUTOPSIED MALE SCHIZOPHRENIC PATIENTS. (E.) Lafferty, C. R. (VA Ctr., Biloxi, Miss.), C. Angel and L. B. Lamm. J. Louisiana Med. Soc. 116(12):443-446, 1964.

No significant differences in cancer mortality between schizophrenic veterans (1451 autopsies) and the male population of the U. S. were found.

65-904 SOME ASPECTS OF ETIOLOGY AND PREVENTION OF PENILE CANCER. (E.) Shabad, A. L. (Urol. Clin., Botkin's Hosp., Moscow). J. Urol. 92(6):696-702, 1964.

The carcinogenicity of retained smegma is suggested by the association of human penile cancer (PC) with phimosis, occurrence of PC within the preputial cavity, low incidence of PC after early circumcision, as well as by experimental data. Among the inhabitants of Kazakhstan, all Moslem natives (who constitute 36% of the male population) were circumcised between ages 4-6 yr. Between 1947-1962, 87 cases of penile cancer were recorded, only 4 of whom were natives (4.6%). Smegma production begins from the first days of life, attains its max. in the first few yr. of life, then decreases. Every case of congenital phimosis represents a direct indication for complete circumcision. (see also CRA 2(3):#458, 1964.)

65-905 DIFFERENCES IN MALE AND FEMALE RATIOS ACCORDING TO THE SITE OF STOMACH CANCER AND ETIOLOGIC HYPOTHESES. (Fr.) Ann. Chir. 18(11-12):664-667, 1964.

In a survey conducted by the Interhospital Group of Paris from 1957-61, 298 out of 451 surgical cases of gastric cancer were selected in which it was possible to determine with accuracy the site of origin of the cancerous process. Of these, 194 occurred in men and 104 in women; the av. was 61 and 64 yr., resp. The male:female ratios according to site were: pylorus 1.5; body 2.7; fundus 3.6; and cardia 6.2; these differences were statistically significant. Analogous results were obtained in a similar analysis conducted among 1,311 cases of gastric cancer which were collected during 1943-60 in a previous study (Permanent Cancer Investigation). In this group the male:female ratios by site were: pylorus 1.8; greater curvature 1.9; surface 2.2; lesser curvature 2.4; cardia 5; and fundus 5. These differences in the sex ratios may be interpreted as the expression of etiological differences. It is suggested that tobacco and ethanol may play a role in the development of cancer of the fundus and cardia, as they

do in cancer of the esophagus and upper respiratory tract.

65-906 THE MULTIFOCAL LYMPHOMA SYNDROME IN AFRICAN CHILDREN IN KENYA. (E.)

Khan, A. G. (King George VI Hosp., Nairobi, Kenya). *J. Laryng.* 78(5):480-498, 1964.

Over a 5-yr. period (1958-62), 140 cases of multifocal lymphoma were encountered in Kenya (97 in, and 43 outside, of Nairobi). Ages ranged from 6 mo.-16 yr. in 125 where age was known; the max. incidence was in the 5-7-yr. age group. The sex distribution was 92/140 (65.71%) for males and 48/140 (34.29%) for females. Tribal distribution studies (17/41 tribes of Kenya represented) showed highest incidences for the Luo (31 cases), Baluhya-Maragoli (21 cases), Kikuyu (11 cases) and Kamba (10 cases) tribes. No cases were noted among European or Indian children nor among adults of any race. In Kenya, the highest incidence was seen in the coastal area and in the Nyanza Province near Lake Victoria. Clinical and microscopic studies are also included.

65-907 COMMON CUTANEOUS CANCER. (E.)

Tolentino, A. D., Jr. *Philipp. J. Surg.* 19(4):233-242, 1964.

Of 1360 skin biopsies examined from 1957-1961 at the North General Hospital in the Philippines, 211 (15.5%) were malignant (1.47% of the total of 14,359 surgical specimens). The 3 most common types of cutaneous cancer were epidermoid carcinoma (93/211; 44%), basal cell carcinoma (69/211; 33%) and malignant melanoma (12/211; 5.7%); male:female ratios were 3:2, 2:3 and 2:1, resp. The highest age incidences were: 61-70 yr. (29%); 51-60 yr. (30.4%); and 51-60 yr. (41.7%), resp. Epidermoid and basal cell carcinomas occurred most frequently in the skin of the head and neck (66% and 93%, resp.); malignant melanoma of the skin was most frequent in the extremities (75%). The histopathological and clinical features of these types are discussed in detail.

65-908 GASTRIC CANCER AND THE ABO BLOOD GROUP SYSTEM. (Ger.) Seifert, B. (Clin.

Surg. Carl Gustav Carus Med. Acad., Dresden, Germany). *Zbl. Chir.* 89(42):1576-1580, 1964.

There was no significant difference between the ABO blood groups of 1000 pts. with gastric carcinoma (720/1000 verified histologically) and those of 50,000 controls in the Dresden region.

65-909 CANCER OF THE COLON AND RECTOSIGMOID.

(E.) Thorlakson, P. H. T. (Dept. Surg., Winnipeg Clin., Manitoba, Canada). *Pacific Med. Surg.* 72(5):269-273, 1964.

The incidence of cancer in the Province of

Manitoba for 1956-61 was as follows: all sites 15,513; digestive organs 4,074; colon and rectum 1,867 (45.8% of all digestive organ cancers). The mortality due to cancer of the colon and rectosigmoid (av. annual rate/100,000 population) for all ages combined was 19, for ages 25 and over it was 36; incidence was 35 and 65, resp. The incidence and mortality for those 70 and over was, resp., 265 and 181. The mortality due to cancer for the same period was as follows: all cancer 7,237; cancer of digestive organs 2,933; cancer of colon and rectum 1,028 (35.0% of all deaths from digestive organ cancer). The incidence (percentage) of precancerous lesions associated with cancer of the colon and rectum included: large bowel adenomata (22% in one earlier series; progressive increase after age 30 to a peak in the eighth decade; multiple adenomas reported as high as 40%); villous papilloma (approx. 35% or higher); ulcerative colitis (3.7%). Familial polyposis was a proven premalignant condition. Carcinomatous change was usually seen 10-15 yr. after the adenomas first appeared (most pts. will have malignancy before 35 yr. of age). Multiple carcinomas occurred in 6.34% of 282 consecutive cases in an earlier series.

65-910 CERVICAL CANCER--THE HIGH RISK PATIENT.

(E.) Robbins, L. C. (U. S. Dept. Health, Educat., Welfare, Washington, D.C.). *J. Irish Med. Assn.* 55(330):158-159, 1964.

The risk of cervical cancer is increased in women who had had abnormal bleeding, discharge or spotting in their early gynecologic history, who engaged in sexual intercourse early in life, who have borne children, and who are at a low economic level. The risk of developing carcinoma *in situ* rises until about age 40, then falls; that of invasive cancer rises to about age 50, then falls. A group of about 10,000 women, receiving welfare support for their children and who combined most of the risk factors mentioned above, showed an incidence of 20 cancers per thousand women (both *in situ* and invasive type); another study of 13,000 women in religious seclusion (and lacking most of these risk factors) showed no cervical cancer at all.

65-911 ENVIRONMENTAL PATHOLOGY AND MEDICAL STATISTICS. (E.) Case, R. A. M.,

C. Coghill, J. L. Harley, J. M. Davies, R. Bell and A. R. Buck. Pp. 134-137 in *British Empire Cancer Campaign 1963*. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

In a discussion on occupational bladder tumors in the rubber industry, it was noted that the following numbers of death certificates where tumor of the bladder (Ministry of Labor figures) was mentioned for 1952-1961 was 47 for England and Wales, 22 for Birmingham C. B. and 25 for England and Wales without Birmingham as compared to 25 death

certificates where tumor of the bladder was mentioned for workers in miscellaneous occupations in the rubber industry of England and Wales, 1952-1961. Although the authors noted that the results must be interpreted with great caution due to a lack of background information, it is suggested that there is no reduction in the number of yearly deaths. From various sources (personal communication, no further details) it has come to light that in 1962 at least 20 new cases of bladder tumors were found in the rubber industry. (See also CRA 2(8):#1565, 1964.)

912 SMOKING HABITS AND HEALTH IN KANSAS AND OTHER CENTRAL STATES. (E.) Hammond, E. C. (Am. Cancer Soc., Inc., New York, N. Y.), L. S. Fent, D. C. Reed and J. L. Wilson. Kansas Med. Soc. 65(12):586-590, 1964.

A total of 25,514 men and women from Kansas, Minnesota, Iowa and Missouri were subjects of an epidemiological study during 1959-62 (2 yr. 10 mo.). Of 10,506 Kansas men aged 40-89 yr., 2,952 smoked 20 or more cigarettes daily and 2,941 never smoked regularly; various respiratory and g.i. complaints were 1.5-5.86 x more frequent among men in the former group. The hospitalized proportion of cigarette smokers who inhaled deeply was greater than for those who did not inhale (26.5%:17.6%), and increased with the amount of cigarettes smoked. It was also greater in men who began smoking cigarettes early in life. Mortality rates based on a total of 88,045 men in the 4 states, of whom 1,300 died at the age of 40-69 yr. and 1,423 died at the age of 70-89 yr., showed a frequency which was 1.51 and 1.84 x greater in cigarette only and cigarette and other smokers, resp., than non-smokers in the younger group, and 1.22 and 1.33 x greater, resp., in the older group. No increase in mortality was noted in pipe or cigar smokers. The mortality ratio among cigarette smokers was noted to increase with the amount smoked, degree of inhalation, and comparative youth when smoking was begun. (See also CRA 2(2):#181; *ibid.*, (7):#1368, 1964; and *ibid.*, 3(3):#456 and #592, 1965.)

913 SMOKING HABITS AND DISEASE. (E.) Hammond, E. C., (Am. Cancer Soc., Inc., New York, N. Y.), L. Berglund and R. Kaslow. Minnesota Med. 48(1):44-49, 1965.

A more detailed account of the Minnesota portion of the study reported in the preceding abstract.

914 ULCER-CANCER OF THE STOMACH. A FOLLOW-UP STUDY OF 473 CASES OF GASTRIC ULCER. Ahre, B. J. E. (St. Erik's Hosp., Stockholm, Sweden), H. Barr and G. Havermark. Gastroenterologia (Basel) 102(2):78-91, 1964.

Of 93 gastric ulcers treated surgically at St. Erik's Hospital in Stockholm in the period 1952-59, 37 (6.2%) diagnosed radiologically as

benign were found to be malignant at operation. A follow-up study in 1962 of 473 pts. with gastric or duodenal ulcers who were treated during 1937-52 revealed malignancy in 9/473 (1.9%). No significant increase in mortality from cancer of the gastric stump was noted in 136 pts. on whom a Billroth II partial gastrectomy had been performed. Statistical studies on 287 men and 122 women with gastric ulcer revealed a significant increase in mortality from pulmonary carcinoma in both sexes, and a significantly higher mortality in men from cancers other than those of the digestive tract.

65-915 EPIDEMIOLOGY OF LEUKEMIA. (Jap.) Wakisaka, Y. (Dept. Intern. Med., Kyoto U. Sch. Med., Japan). Nippon Ishikai Zasshi (J. Jap. Med. Assn.) 51(5):751-769, 1964.

Epidemiologic studies of leukemia in Japan have revealed a steady increase during the past half century; death rate figures (per 100,000 population) were 0.5 in 1910, 1.3 in 1940, 1.5 in 1950 and 2.8 in 1960. An increase was noted among both males and females, although death rates were higher among males (male:female ratio 1.3-1.6:1). The highest incidence was found in the age group 60-85 yr.; the second highest was seen among children 0-4 yr. old. This two-peak pattern was observed in both sexes and for acute leukemia. In chronic myeloid leukemia (CML), there was only one slowly rising peak at approx. 60 yr. of age. Analysis of 3,454 deaths due to leukemia (collected from 158 Japanese hospitals) showed the following distribution: acute myeloid leukemia 56.8%, acute lymphatic 8.7%, other acute forms 5.9%, chronic myeloid 19.2%, chronic lymphatic leukemia (CLL) 2.6%, chronic basophilic or eosinophilic 0.1% and monocytic 6.7%. Acute leukemia was seen most frequently at 15-19 yr., monocytic leukemia at all ages, CML in middle-age and CLL in those > 45 yr. old. Analysis based on various districts did not disclose any recognizable trend. Incidence of familial leukemia was noted in 0.8% of those dying of leukemia. Atomic blast-exposed subjects showed a higher leukemia death rate (approx. 7 x) than did the general population. There was no significant history of other cancers in the families of leukemia pts. In 25 pts. with acute myeloid leukemia the leukemia was apparently induced by therapeutic radiations (1,000-10,000 r); latent period was 1-4 yr. (See also CRA 1(11):#2006, 1964; and *ibid.*, 2(6):#1153, 1964.)

65-916 ETIOLOGY AND PATHOGENESIS OF PRIMARY CANCER OF THE LIVER IN BLACK AFRICA. (Fr.) Payet, M. (U. Dakar Sch. Med., Senegal). Acta Un. Int. Cancr. 20(3):565-566, 1964.

In a search for a common factor to be found in all African people who have a marked tendency to develop liver cancer, the author examines and discusses nutritional factors, infections and parasites, previous liver conditions, the role of endocrine glands and carcinogenic factors in food.

A characteristic blood protein picture and a non-individualized racial factor are the only two consistent findings.

- 65-917 CANCER AND GEOGRAPHY. (Fr.) Guelfi, J. (Dept. Physics, U. Rennes Sch. Med., France) and J. Pincet. Acta Un. Int. Cancr. 20(3):612, 1964.

In a study of cancer incidence in relation to the natural geographic factors, the authors examined the av. age of death between 1954-60, the percentage of cancer deaths and the uranium, radium and radon content in rocks and water in 20 communities of the Cotes du Nord department (uranium-rich area) in France. Preliminary results suggest a relationship between the increased percentage of cancer deaths and the amount of radon ingested by the people.

- 65-918 REGIONAL DIFFERENCES IN CANCER MORTALITY RATES. (E., Abstract) Mayneford, W. V., Director (Dept. Phys., Royal Cancer Hosp., London). Pp. 147-148 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

A study is reported of the relation between mortality rates from gastric cancer in the country boroughs of England and Wales during 1921-1953 and the hardness of the drinking water. An examination of trace element content of drinking water obtained from selected hard and soft water areas failed to reveal any striking differences in content.

- 65-919 LUNG CANCER IN SOUTH AFRICANS AND BRITISH IMMIGRANTS. (E.) Dean, G. (East. Cape Prov. Hosp., Port Elizabeth, S. Afr.). Proc. Roy. Soc. Med. 57(10)(Pt. 2):984-987, 1964.

In an extension of the study reported in CRA 1(7):#1382, 1963, the author substantiates his earlier views on the correlation between cigarette smoking, air pollution and effects of the climate with the

incidence of lung cancer in native and migrant populations.

- 65-920 LUNG CANCER AND DATE OF BIRTH. (E., Abstract) Davies, J. M. Pp. 170-171 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 1963, 707 pp.

See CRA 1(12):#2180, 1964. The number of pts. in the English series is now 3,358; results are still non-significant.

- 65-921 INCIDENCE OF LEUKEMIA IN CHINESE. A CLINICAL STUDY. (E.) Hwang, T. S. (Dept. Med., Nat. Defense Med. Ctr., Taipei, Taiwan) and T. C. Chen. Zhonghua Yixue Zazhi (Chin. Med. J., Taipei) 9(3):215-222, 1962.

A total of 87 cases (68, or 78.17%, male; 19, or 21.83%, female) have been analyzed in 7 Chinese Armed Forces hospitals for the period January 1958 to December 1961. The highest incidences were observed between the ages of 21 and 40 for acute myeloid leukemia (AML); 0-20 yr. for acute lymphatic leukemia (ALL); 21-40 yr. for acute monocytic leukemia (AMoL); 31-40 yr. for chronic myeloid leukemia (CML). Comparisons with a 1950-57 survey showed increased incidences for AML and AMoL; the same incidence for CML; somewhat decreased incidence for ALL. The factors influencing the rising curve and the low incidence of CLL are discussed (20 references), and clinico-pathological findings are presented.

- 65-922 STATISTICAL SURVEY OF THE RESULTS OF THE MEDICAL EXAMINATION OF ATOMIC BOMB SURVIVORS: REPORT I. (Jap.) Miura, M. (Comm. Res. Stat. A-Bomb Casual., Hiroshima). Nagasaki Igaku Zasshi (Nagasaki Med. J.) 38(Suppl.):21-26, 1963.

Medical examinations conducted during the yr. 1961-62 of a total of 34,678 atomic bomb survivors in Hiroshima uncovered two cases of asymptomatic chronic myeloid leukemia. The 34,678 represented 47% of the entire number of 85,000 atomic bomb survivors in Hiroshima registered up to the time of this examination.

See also abstract nos.: 650,653,658,665,673,685,690,705,768,769,961

MISCELLANEOUS

65-923 UNTREATED CHRONIC MYELOCYTIC LEUKEMIA ASSOCIATED WITH AN UNUSUAL CHROMOSOME PATTERN. (E.) Houston, E. W. (Dept. Int. Med., Texas Med. Br., Galveston), W. C. Levin and E. Ritzmann. Ann. Intern. Med. 61(4):696-702, 1964.

Cytomorphologic studies in a 48-year-old woman with untreated chronic myeloid leukemia indicated the emergence of an abnormal stem-line of cells showing in addition to the Ph¹ chromosome a distinctive submetacentric chromosome longer than any other in the cell. In each of 7 karyotyped cells, including 2 near-tetraploid cells with 91 chromosomes, one chromosome of the normal complement was missing with no pattern of consistency. The consistency in the morphology of the long abnormal chromosome, however, contrasted with the inconsistency of the size and arm ratios of the missing chromosomes from cell to cell. The pt. had received diagnostic irradiation during the 2 yr. prior to observation.

65-924 SPECIFICITY OF THE PHILADELPHIA CHROMOSOME. CYTOGENETIC STUDIES IN CASES OF CHRONIC MYELOCYTIC LEUKEMIA AND MYELOID METAPLASIA. (E.) Goh, K.-O. (Dept. Med., U. Rochester Sch. Med. Dent., N. Y.) and S. N. Chatterjee. Ann. Intern. Med. 61(4):609-624, 1964. See CRA 2(3):#594, 1964.

65-925 CASE HISTORY OF PRICKLE CELL CARCINOMA IN THE COURSE OF CHRONIC INFLAMMATION OF THE TIBIA. (Pol.) Jabłoński, H. (Dept. Surg., Wit. Hosp., Lublin, Poland) and M. Górski. Pol. Tyg. Lek. 19(41):1577-1578, 1964.

A 40-year-old man with a 43-year history of chronic tibial osteomyelitis and recurrent fistula presented with another fistulous ulceration. Histological examination of local skin and bone revealed a prickle cell carcinoma.

65-926 A RE-EVALUATION OF THE MALIGNANT POTENTIAL OF COLORECTAL ADENOMAS. (E.) Hall, R. and J. D. Haller. Surg. Gynec. Obstet. 124(4):867-887, 1964.

Following an extensive review of the literature (22 references) and clinical observations over several yr., the authors conclude that little, if any, evidence exists to support the theory that benign smooth lobulated or villous colorectal adenomas undergo transformation into invasive metastasizing cancer. The current practice of early diagnosis and removal of all adenomas has reduced mortality from cancer of the colon. Efforts are made for standardization of laboratory and clinical nomenclature.

65-927 HISTOGENESIS OF ENDOMETRIAL CARCINOMA. (E.) Gray, L. A. (Dept. Obstet. Gynec., U. Louisville Sch. Med., Ky.) and M. L. Barnes. Trans. South. Surg. Assn. 75:358-368, 1964.

See CRA 2(8):#1576, 1964.

65-928 FUSION OF CELLS AND NUCLEI IN THE ADENOCARCINOMA OF THE BODY OF THE UTERUS. PRELIMINARY REPORT. (E.) Gross, K. (Oncol. Inst., Prague 8, Czech.). Oncologia (Basel) 18(1):68-74, 1964.

The fusion of human somatic cells was observed and documented in the tissue culture of an adenocarcinoma of the body of the uterus. The fusion was preceded by a number of changes mainly in the cell nucleus. The same fusing was also found in non-tumorous tissue cultures. The significance of cell fusion as a biologic phenomenon is discussed.

65-929 CANCER OF THE GASTRIC FUNDUS, RESECTED FOR PEPTIC ULCER, AND TREATED SURGICALLY. (Rus.) Kukosh, V. I. (S. M. Kirov Gorky Inst. Med., USSR), A. A. Cherniavskii and T. N. Mikhailova. Khirurgiia (Moskva) 40(8):3-8, 1964.

Among 15 pts. (13 men, 2 women; age 38-71 yr.) who underwent surgery for cancer of the gastric stump and who had been resected previously for gastric (12) or duodenal (3) ulcer, 12 apparently had primary cancers appearing 5-23 yr. after the first operation.

65-930 THE FATE OF Cr⁵¹ LABELLED EHRLICH ASCITES TUMOUR CELLS. (E.) Vincent, P. C. (Wellcome Lab. Exp. Med. Surg., Sydney, Australia) and A. Nicholls. Aust. J. Exp. Biol. Med. Sci. 42(4):569-578, 1964.

Approximately 64% of the Cr⁵¹ bound to Ehrlich ascites tumor cells was lost within 24 hr. after being inj. i.v. into adult male and female white Swiss mice at conc. of 0.1 or 1.0 μ C/10⁶ cells. Distribution of the eluted isotope following the inj. accounted for most of the activity in the liver and spleen and all of the activity in the kidneys. Within 1 min. of inj., a marked excess of radioactivity was found in the lungs of female mice when compared with male mice, which is consistent with previous reports wherein a greater metastatic tumor growth was noted in female mice. However, evidence is presented showing that this difference is not due to elution of the isotope.

65-931 CLINICAL AND MORPHOLOGIC CORRELATIONS DURING DEVELOPMENT OF PRECANCEROUS STATES AND CARCINOMA OF HUMAN CERVIX UTERI. (E.)

Krotova, L. I. (Inst. Oncol., USSR Acad. Med. Sci., Leningrad). Fed. Proc. (Transl. Suppl.) 23(5) (Pt. 2):T1021-T1027, 1964.

This article is the English version of a Russian article appearing in Vop. Onkol. 9(12):26-, 1963. See CRA 2(2):#375, 1964.

65-932 CHROMOSOME STUDIES OF VARIOUS STRAINS OF ASCITES HEPATOMAS IN RATS. (E.) Isaka, H. (Sasaki Inst., Tokyo). Nat. Cancer Inst. Monogr. (16):95-130, 1964.

Mitosis (rates, duration of each phase and of the total cycle) was studied by phase contrast microscopy in 18 strains of rat ascites hepatoma at peak growth (4-day ascites). Mitotic abnormalities such as multipolar divisions, binucleate cells, and reversion (after anaphase) to interphase, were noted. The chromosomes were studied of 16 hepatoma strains which varied in their growth rate, transplantability, sensitivity to X-rays and to chemotherapeutic agents. Their chromosome numbers varied widely, from hypodiploid to hypotetraploid, but each strain had its own modal chromosome number. Tumor cell size was not correlated with chromosome number. Each of 18 strains of ascites hepatoma had its own pattern of chromosome morphology; only 1 strain showed a SAT chromosome (a rod connected by a fine thread to a minute body) and 2 strains showed rare endomitotic cells. Most strains were highly stable in chromosome constitution during their serial passages; 2 strains developed different sublines. Two single-cell clones of different ploidy showed the mosaic constitution of one neoplastic population.

65-933 BLOOD AND SKIN CHROMOSOMAL ALTERATIONS OF A CLONAL TYPE IN A LEUKEMIC MAN PREVIOUSLY IRRADIATED FOR A LUNG CARCINOMA. (E.) Engel, E. (Dept. Med., Vanderbilt U. Sch. Med., Nashville, Tenn.), J. M. Flexner, M. L. Engel-de Montmollin and H. E. Frank. Cytogenetics (Basel) 3(4):228-251, 1964.

Three yr. after irradiation of a 49-year-old man following surgical excision of a bronchogenic carcinoma, chronic myelogenous leukemia was diagnosed. A peripheral blood smear showed the Philadelphia chromosome. All 4 tissue cultures of biopsied skin from the irradiation site showed chromosomal alterations. Marker chromosomes showed 5 stem-lines. One of the marker chromosomes in skin metaphases had the features of the Ph₁ chromosome, with satellites and acrocentric association. All 122 metaphases in skin cells analyzed showed abnormal karyotypes, although most were diploid or nearly so, and tetraploids were rather frequent (39/296 cells).

65-934 O₂ DEFICIENCY AND DEVELOPMENT OF INCREASED RESISTANCE TO GROWTH OF SARCOMA M-1 IN RATS. (E.) Arkhipov, G. N. (Inst. Norm.

Path. Physiol., USSR Acad. Med. Sci., Moscow). Fed. Proc. (Transl. Suppl.) 23(6) (Pt. 2):T1364-T1366, 1964.

This article is the English version of a Russian article appearing in Pat. Fiziol. Eksp. Ter. 7(3):59-, 1963. The relation of tumor growth to the degree of adaptation to conditions of hypoxia was studied in 3 groups of 15 rats each which were implanted with sarcoma M-1 before being placed in decompression chambers at simulated altitudes. Tumor growth was inhibited 18%, 53% and 57% at "altitudes" of 6000, 9500 and 10,750 m, resp. Tumor inhibition was not caused by the development of resistance to hypoxia in these animals in that their ability to adapt to these conditions decreased as the altitudes to which they were subjected increased. Two groups of 9 rats each were subjected to hypoxic conditions before tumor implantation; at normal barometric pressure, after being placed at altitudes of 8,000 and 10,000 m, 9/9 and 8/9 rats, resp., developed tumors with an av. wt. of 4.5 and 1.88 g, resp. (as compared to av. tumor wt. of 9.3 g in controls). In another experiment, gradual acclimatization to 8000 m resulted in only slight tumor inhibition.

65-935 DEVELOPMENT OF SQUAMOUS CELL CARCINOMA IN BENIGN MUCOUS MEMBRANE PEMPHIGUS: REPORT OF A CASE. (E.) Jamieson, W. J. (63 Collins St., Melbourne, Australia). Aust. J. Derm. 7(3):129-130, 1964.

A case is reported of a 40-year-old man with a 9-yr. history of benign buccal mucous membrane pemphigus who developed a moderately well differentiated squamous cell carcinoma of the left anterior hard palate which later presented as tumor masses over the floor of the middle and anterior fossae.

65-936 SCOPOLETIN, SCOPOLIN AND CHLOROGENIC ACID IN TUMOURS OF INTERSPECIFIC NICOTIANA HYBRIDS. (E.) Tso, T. C. (Crops Res. Div., Agric. Res. Serv., Beltsville, Md.), L. G. Burk, L. J. Dieterman and S. H. Wender. Nature (London) 204:779-780, 1964.

Tumors of various *Nicotiana* hybrids yielded 3 main zones with UV light: a blue-fluorescing front zone containing scopolin; a non-fluorescing zone; and an intense blue-fluorescing zone containing scopoletin. Quantitatively, no consistent relationship between the amount of scopoletin and that of scopolin was found. In comparison to the parental material, the tumorous tissue of the F₁ *Nicotiana* hybrids showed a sharp increase of scopolin and the new formation of scopoletin. These compounds seemed to have a relationship with tumor formation in the F₁ hybrids. Chlorogenic acid levels, however, were similar in parents and F₁ hybrids.

937 THE NUCLEIC ACID AND PROTEIN METABOLISM OF LEUKOBLASTS OF CHILDREN SUFFERING FROM ACUTE LEUKEMIA. (E.) Kiss, S. (2nd Dept. Mediat., Med. U. Budapest, Hungary), D. Schuler and J. Siegler. Sangre (Barc.) 9(2):217-221, 1964.

The nucleic acid and protein metabolism of leukoblasts (LB) of children with acute leukemia and of normal lymphocytes (LC) of healthy children were studied *in vitro* using labeled glycine-1- 14 C. The incorporation of G into the proteins and nucleic acids of LB was about 15 times higher than that of LC. This increased metabolism of proteins and nucleic acids of LB was significantly diminished ($p < 0.01$) when LB were incub. in the plasma of healthy adults. No significant differences existed between the amino acid levels of plasma of healthy people and leukemic children.

938 CARCINOMA OF THE GALLBLADDER FOLLOWING CHOLECYSTOSTOMY. (E.) Cowley, L. L. (Mary's Long Beach Hosp., Cal.). Am. Surg. 8(8):474-475, 1964.

Three cases (2 females, 1 male; age 59-73 yr.) with primary adenocarcinoma of the gallbladder occurring 4.5, 5, and 15 yr. after cholecystostomy for acute cholecystitis are described.

939 TUMORS OCCURRING IN NEWBORN MICE AFTER INOCULATION OF HUMAN CANCER MATERIAL. (E.) Moore, A. E. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.) and A. Cuba Caparó. Cancer Res. 24(5):765-769, 1964.

A more extensive report is presented of part of 1(5):#802, 1963. After inj. of filtrates of tissue culture preparations from 208 specimens from pts. with cancer, from benign lesions and from normal individuals into 3990 newborn Swiss mice, 10.2% given preparations from lymphoma pts. developed tumors, as compared with 4.3% for uninoculated controls. Tumors chiefly were mammary adenocarcinomas and lymphosarcomas that often were sited to the thymus. The authors believe the increased number of tumors in the inoc. animals is due to an activation of tumor viruses already present.

940 ASSOCIATION OF BILATERAL VIIIth NERVE TUMORS WITH MENINGIOMAS IN VON RECKLINGHAUSEN'S DISEASE. (E.) Nager, G. T. (Dept. Otolaryng., Johns Hopkins U. Sch. Med., Baltimore, Md.). Laryngoscope 74(9):1220-1261, 1964.

In an extensive review (43 references) the case is presented of a white college girl, 20 yr. old, with a central form of Recklinghausen's disease consisting of a meningioma (en-plaque?) of the sphenoid ridge with growth into the anterior, middle and posterior cranial fossae, involvement of the left VIIth, IXth, Xth, and XIIth cranial

nerves, and with evidence of bilateral vestibular neurinomas. Family history showed a mother with a number of small tumors in the scalp and one of the mother's sisters with various skin tumors.

65-941 MALIGNANT MELANOMAS IN PORCINE LITTERMATES. (E.) Hjerpe, C. A. (U. California Sch. Veterin. Med., Davis) and G. H. Theilen. J. Am. Vet. Med. Assn. 144(10):1129-1131, 1964.

A 100-day-old barrow and a 4-month-old gilt from the same litter (Duroc-Jersey) developed malignant melanomas of the left perineal and neck regions, resp. The occurrence of malignant melanomas in young Duroc-Jersey swine littermates suggests a congenital influence.

65-942 A HOARSE VOICE AND A RED FACE. (E.) Black, J. I. M. (Royal Victoria Hosp., Newcastle-on-Tyne, England), J. M. Jackson and G. Holti. J. Laryng. 78(10):924-930, 1964.

In a study of a series of cases of so-called keratosis of the larynx, the authors were impressed that the pts. were "thick-set, red-skinned people". The condition is a response of the laryngeal epithelium to a long-acting persistent irritant, presenting as chronic laryngitis or leukoplakia and is of importance as a possible precancerous lesion. Of 16 males and 2 females seen over a course of 10 yr., several cases presented following acute alcoholism, and usually coincidental tobacco excess, in which the response of hoarseness was far greater than one would expect in a normal subject.

65-943 TRAUMATIC FACTORS IN THE ORIGIN OF MELANOMA? (Ger.) Gartmann, H. (Skin Clin., U. Heidelberg, Germany). Munchen Med. Wschr. 106(46):2086-2091, 1964.

In a 16-yr. clinical study on over 3000 benign and malignant pigmented cell tumors of the skin, there were 342 cases of melanoma. Only 48 developed in the region of a preexisting junctional nevus; 236 developed as an intra-epithelial melanoma or a melanosis circumscripta preblastomatosa. The method of origin was not clearly recognizable in the remaining cases. In an investigation of 347 junctional nevi which underwent acute or chronic trauma, it was concluded that a single trauma does not transform a junctional nevus nor a melanosis circumscripta preblastomatosa into a melanoma. Even chronic trauma would probably not cause such transformation. (See also CRA 3(2):#392, 1965.)

65-944 PRESENTATION OF A CASE OF MULTIPLE CANCER. (Sp.) Montalbetti, A. (Inst. Neoplastic Dis., Lima, Peru). Acta Cancer (Lima) 3(8-9):41-44, 1964.

A 64-year-old woman underwent left hemicolectomy for an adenocarcinoma of the sigmoid; 8 mo. later a right hemicolectomy was performed and an adenocarcinoma of the cecum with infiltration to the muscular wall was removed; 3 yr. later an undifferentiated carcinoma of the stomach was removed and multiple metastases to the liver and ascites were observed. A review (12 references) of multiple primary malignant tumors is included.

- 65-945 SARCOMA DEVELOPING IN SCAR. (E.) Coetzee, T. S. Afr. J. Surg. 2(2): 49-54, 1964.

The case histories are presented of a 47-year-old African male who developed dermatofibrosarcoma protuberans at the site of a scar caused by a vaccination given 4 mo. previously, and a 60-year-old African woman in whom an ulcerating spindle cell sarcoma occurred at the site of a preexistent burn scar.

- 65-946 TWO CASES OF CHRONIC MYELOID LEUKAEMIA WITH PRESUMABLY IDENTICAL 47-CHROMOSOME CELL-LINES IN THE BLOOD. (E.) Pedersen, B. (Inst. Human Genet., U. Copenhagen, Denmark). Acta Path. Microbiol. Scand. 61(4):497-502, 1964.

Two male pts. (each with 47 chromosomes) with chronic myeloid leukemia showed in cultured leukocytes, in addition to the Ph^1 chromosome, other karyotypic aberrations: 2 extra chromosomes in the 6-X-12 group, and one too few in the 17-18 group. In both pts. the relative frequency of cells with this aberrant karyotype increased as the clinical condition of the pt. worsened, in spite of cytotoxic treatment. It is suggested that this loss of drug sensitivity, by permitting proliferation of the abnormal cell line, might be responsible for clinical deterioration.

- 65-947 HEAVY CHAIN DISEASE--A NEW DISORDER OF SERUM γ -GLOBULINS. REPORT OF THE FIRST CASE. (E.) Franklin, E. C. (Dept. Med., New York U. Sch. Med., N. Y.), J. Lowenstein, B. Bigelow and M. Meltzer. Am. J. Med. 37(3): 332-350, 1964.

The first example of a paraproteinemia characterized by the production of a fragment of gamma-globulin similar to the heavy chain of 7S gamma-globulin is reported in a 44-year-old Negro man who presented initially with generalized lymphadenopathy of one month's duration. The physical and chemical properties of this protein are described. Studies to elucidate its origin show it to be independently synthesized and not a product of 7S gamma-globulin catabolism. The similarity of the clinical and laboratory features of this pt. and 4 subjects described in a following report indicate that "heavy chain disease" is another group of paraproteinemias associated with malignant proliferation and lymphocytic cell

series. The mother of the pt. reported died of "brain tumor" and a sister was mastectomized for carcinoma.

- 65-948 CLINICAL AND IMMUNOCHEMICAL STUDIES OF FOUR CASES OF HEAVY ($H\gamma^2$) CHAIN DISEASE. (E.) Osserman, E. F. (Dept. Med., Columbia U. Coll. Phys. Surg., New York, N. Y.) and K. Takatsuki. Am. J. Med. 37(3):351-373, 1964.

In addition to the case presented in the preceding abstract, 4 other cases are detailed.

- 65-949 PSYCHO-SOCIOLOGICAL AND ANTHROPOLOGICAL ANALYSIS OF LEUKEMIC PATIENTS. (E.) Aleksandrowicz, J. (3rd Clin. Intern., Acad. Med. Cracow, Poland), A. Brozek, K. Kaczanowski, A. Kepinski and A. Zuirowska. Sangre (Barc.) 9(1):5-8, 1964.

In regards to 100 pts. with different types of leukemia, a discussion is presented of such factors as psychosocial, financial and educational conditions; family conditions as children and as adults; presence of periods of conflict, personality expressed as "moods", personality in relation to other people in the environment, family and work conflicts and the results of Rorschach tests. According to the Kretschmer constitutional classification, of 49 women and 58 men with leukemia, pyknic and athletic types comprised the majority of lymphatic leukemia pts.; the majority of chronic granulocytic leukemia pts. were leptosomic. There were striking physiognomic similarities in the faces of each group of leukemic pts. The psychosomatic correlation with different types of leukemia creates an impression that, depending on the psychosomatic type, the unknown leukemogenic factors initiate a proliferative reaction of either the lymphoreticular or the granulocytic tissue. (See also CRA 3(3):#413, 1965 and the following abstract.)

- 65-950 ANTHROPOMETRY OF PATIENTS WITH LEUKEMIA. (Pol.) Aleksandrowicz, J. (3rd Clin. Intern. Dis., Acad. Med. Cracow, Poland), A. Brozek, K. Kaczanowski and B. Piaskowski. Pol. Tyg. Lek. 19(43):1636-1638, 1964.

In regard to the anthropometric classification of pts. with leukemia, 1 woman and 7 men are added to the patient material in the paper presented in the preceding abstract.

- 65-951 PROBLEMS OF THE ORIGIN OF YOSHIDA SARCOMA. (E.) Yoshida, T. (Cancer Inst. Tokyo), H. Isaka and H. Satoh. Arzneimittelforschung 14(7):735-741, 1964.

Repeated heterotransplantation by i.p. inoc. of ascites fluid from mouse leukemic ascites tumor SN-36 into rats plus one treatment with cortisone acetate resulted in formation of ascites showing epithelial bonding of cells, forming the so-called

islands" of ascites hepatomas. These cells were designated as LY-306. Once they had shown their epithelial nature, the Yoshida sarcoma (YS) cells remained stable even after repeated transplantations. Two additional cell strains, LY-336 and LY-346 were similarly derived. Another tumor strain, LY-7, developed when cells of YS were transplanted to a rat in which transplantation of a polyploid subline of YS (83 days previously) had failed. Four of the 5 above mentioned transplant strains of YS which show epithelial characteristics have chromosome numbers from 66-68, whereas the modal number of chromosomes in YS is 80. Two strains have the characteristic marker chromosome of YS (such as the large metacentrics), while others do not have it. The chromosomes of these 4 strains differ morphologically from those of the 56 transplant strains of ascites hepatomas available.

952 PAROSTEAL OSTEOSARCOMA. (E.) Harkess, J. W. (Dept. Surg., Med. Coll. Georgia, Augusta). Am. Surg. 30(11):730-736, 1964.

A 1-year-old white woman injured her right thigh in a basketball game while in high school and developed a mass which grew and became harder over the next 5 yr. and initially was believed to be myositis ossificans. The tumor recurred after series of resections, caused pathologic fracture, produced pulmonary metastases and had microscopic features of parosteal sarcoma.

953 MULTIPLE MYELOMA IN SIBLINGS. (E.) Thomas, T. F. (Syracuse Mem. Hosp., New York). New York J. Med. 64(16):2096-2099, 1964.

Two detailed case reports are given of multiple myeloma in a 56-year-old man and in his 60-year-old sister. The sister had had a breast tumor removed 23 yr. previously. This is the fourth record of familial multiple myeloma in the English medical literature.

954 A STUDY OF VARIOUS NATURAL IMMUNITY FACTORS IN MALIGNANT NEOPLASMS. WITH PARTICULAR REFERENCE TO FEMALE GENITAL LOCALIZATION. (It.) Vatteroni, M. (Inst. Clin. Obstet. Gynec., U. Rome). Quad. Clin. Ostet. Ginec. 10(3):168-177, 1964.

The author reviews the various mechanisms and factors, including complement, C-reactive protein, lysozyme and properdin, involved in natural immunity. With regard to the relationship between natural immunity and malignancy, experimental evidence is reported for the successful use of interferon in the detection of cancer of the uterus and cervix, although not all authors agree on its effectiveness. Examples from the literature are presented showing that the induction and development of a neoplasm are frequently related to

variations in levels of such natural immunity factors as lysozyme and properdin. (26 references)

65-955 CAROTID BODY TUMORS IN A LARGE FAMILY GROUP. (E.) Katz, A. D. Am. J. Surg. 108(4):570-573, 1964.

A report is presented of the occurrence of carotid body tumors in 1 of 3 sisters and 5/6 brothers of one family. One sister and the mother have refused examination.

65-956 ON NEONATAL LEUKEMIA. (E.) Stransky, E. (Dept. Pediat., U. Philippines Coll. Med., Manila) and S. R. Sarcia. Ann. Paediat. (Basel) 203(1):68-76, 1964.

A case is presented of probable acute neonatal myelogenous leukemia in a 6-week-old male. It is believed to be the first case of neonatal leukemia observed in the Philippines. A review (47 references) of similar cases from the literature is included.

65-957 ASSOCIATION OF NEPHROTIC SYNDROME AND NEPHROBLASTOMA IN SIBLINGS. (E.) Zunin, C. (Santa Croce Hosp., Cuneo, Italy) and F. Soave. Ann. Paediat. (Basel) 203(1):29-38, 1964.

The case histories are presented of a girl (age 13 mo.) and her brother (7 mo.) with Wilms' nephroblastoma associated with a nephrotic syndrome. Due to the familial nature of these cases, it is believed that the nephrotic syndrome and the tumor arose contemporaneously rather than consequentially.

65-958 ESTABLISHMENT OF MN-LYMPHOSARCOMA AS A PERMANENT CELL STRAIN IN TISSUE CULTURE. (E.) Mori, S. (Yamaguchi Sch. Med., Japan), Y. Harada and I. Yamaoka. Bull. Yamaguchi Med. Sch. 10(3):167-177, 1963.

Three tissue culture strains derived from the T-strain of MN-lymphosarcoma originally carried i.p. in female NA₂ mice have been maintained by *in vitro* serial subcultivation for 498-515 days. The fibroblast-like cells of the 3 strains differed morphologically only in size. During the 12th-52nd *in vitro* generation, the cells were intermittently inoc. i.p. into female NA₂ mice and strains 1 and 3 induced the development of ascites tumors with mortalities of 100% and 80%, resp., while strain 2 cells appeared to lose their transplantability. A gradual adaptation to growth in an altered environment was indicated by evidence that each serial *in vivo* passage of strain 1 cells caused a decrease in the av. survival time of the mice until it was shortened within a few generations to that of the original mouse to mouse passage.

65-959 METACHRONOUS PRIMARY CARCINOMAS OF THE COLON. REPORT OF A CASE. (E.)

Alvich, J. P. (Mother Cabrini Mem. Hosp., New York, N. Y.) and H. I. Lepow. J. Int. Coll. Surg. 42(5) (Sect. 1):553-565, 1964.

A detailed case history is presented of a 55-year-old woman with metachronous primary carcinomas of the colon presenting as polypoid masses upon 3 resections of the large intestine. A cervical polyp had been removed 14 mo. prior to the original colectomy which revealed 1 lesion; 2 subsequent colectomies (performed 10 and 16 mo. later) revealed 2 lesions each. Four of the lesions were diagnosed histologically as primary invasive adenocarcinoma, and 1 as primary adenocarcinoma in situ.

65-960 A RELATION BETWEEN METASTASES OF CANCER AND SECRETION OF BLOOD GROUP SUBSTANCE.

(E.) McNeil, C. (Holy Cross Hosp. Res. Found., Salt Lake City, Utah), E. F. Trentelman, J. N. Ladle and H. P. Plenck. Am. J. Clin. Path. 42(5):498-501, 1964.

In a study of 919 pts. with various cancers the incidence of cancer among secretors did not differ significantly from that among non-secretors. However, the data indicate that secretion favors metastases, and that non-secretion favors localization and improved survival from cancer. Prostate, lung, colon, and stomach carcinomas were of high secretor frequency. The distant metastases of prostatic cancers, in particular, seem to approach significance, in that there was a lack of non-secretors in 15 pts. It seems possible that the conc. of endothelial mucopolysaccharides and their function as a permeable barrier to cell infiltration might be related to the secretor status of the pt.

65-961 PATHOGENESIS OF MALIGNANT GROWTH. (Cz.)

Patrná, H. Cas. Lek. Cesk. 103(39):1091-1094, 1964.

During the malignant transformation of cells, antigenic changes occur. Since RES ensures the physiological and pathological growth inhibition by means of its antimetabolites (normal and immune globulins), the author contends that malignant growth develops as a result of impaired growth inhibition (i.e., functional failure of the RES) rather than as a result of growth stimulation (e.g., by neurohumoral regulation). The rising trend of malignant growths in children and teenagers in Czechoslovakia and its separate regions is illustrated by tables and graphs.

65-962 SERIAL CYTOGENETIC AND HEMATOLOGIC STUDIES ON A MONGOL WITH TRISOMY-21 AND ACUTE CONGENITAL LEUKEMIA. (E.)

Honda, F. (Dept. Obstet. Gynec., U. Rochester Sch. Med. Dent., N.Y.), H. H. Punnett, E. Charney,

G. Miller and H. A. Thiede. J. Pediat. 65(6):880-887, 1964.

A male child with mongolism and acute congenital leukemia, which spontaneously remitted for 1 yr., died of acute myeloid leukemia at the age of 2 1/3 yr. A major cell type with 47 chromosomes (trisomy-21) and a minor cell line with 48 chromosomes (trisomy-21 with an additional chromosome in the 6-12 group) were noted in the marrow when the pt. was 3 weeks old. During remission, a third transient line showing 1 or 2 deleted small acrocentrics replacing the normal chromosomes 21-22 was observed in the peripheral blood cells. The cell type with 48 chromosomes became the major line in the marrow after exacerbation of the disease. Leukocytes cultured without phytohemagglutinin showed a mode of 48 chromosomes; with phytohemagglutinin it was 47. Cells from the skin, lung, thymus, lymph and spleen had 47 chromosomes.

65-963 THERE IS ALWAYS HOPE. (E.) Siegel, V. (292 River Rd., Red Bank, N. J.). J. Med. Soc. New Jersey 61(12):515-516, 1964.

Three cases showing apparent cancer cures are reported. Autopsies showed no evidence of malignancy in a 57-year-old woman who was diagnosed as having Hodgkin's disease 19 yr. previously, in a 72-year-old man who had had a colostomy 15 yr. previously for grade 3 adenocarcinoma of the sigmoid with peritoneal metastases, and in an adult male in whom biopsy revealed pulmonary adenocarcinoma 1.5 yr. previously.

65-964 SPONTANEOUS REGRESSION OF MALIGNANT MELANOMA. (E.) Baker, H. W. (Dept. Surg., U. Oregon Sch. Med., Portland). Am. Surg. 30(12):825-829, 1964.

A 46-year-old man with histologically confirmed malignant melanoma of the ear, with metastasis to one lymph node, which recurred 9 mo. after surgery and increased in size during the ensuing 6 mo., showed no evidence of malignancy 13 mo. after the date of tumor recurrence. He was free of tumor when last examined more than 7 yr. after surgery.

65-965 SPONTANEOUS REGRESSION OF BRONCHOGENIC CARCINOMA WITH FIVE YEAR SURVIVAL. (E.) Bell, J. W. (Dept. Surg., VA Hosp., Seattle, Wash.), J. E. Jesseph and R. S. Leighton. J. Thorac. Cardio. Surg. 48(6):984-990, 1964.

The case history is presented of spontaneous tumor regression in a 37-year-old man with histologically verified inoperable grade 3 epidermoid carcinoma of the left bronchus. Complete radiological disappearance of the lesion was noted 6 mo. after diagnosis. Two factors which might possibly have had some influence on the regression

re 2 wk. of postoperative fever which coincided with 1,200 r X-irradiation. Whether fever and radiation were synergistic in effecting an immune response remains to be determined. The subject remained cancer-free and in good physical health at a follow-up 5 yr. later.

- 966 AN ASSOCIATION BETWEEN THE RHEUMATIC DISEASES AND THE RETICULOSES. (E.) A. J. (Min. Pensions Nat. Insur., London). *J. Rheum. Dis.* 23(6):480-484, 1964.

The incidence of rheumatic diseases was studied in 1,356 cases of reticuloses occurring between 1949-58 in males of the British Armed Forces. Significant differences between the types of reticulosis were found for such possible factors as fractures, other injuries, and chronic sepsis when compared with a control group of 1,378 cases of rheumatic diseases, injuries and neoplasms other than reticuloses. No significant correlation could be shown between the reticuloses and antibiotics or sulfa drugs. In leukemia (735 cases), lymphoma (200 cases) and Hodgkin's disease (377 cases), there was an association of high statistical significance with rheumatic diseases; this association was not seen with the 'other reticulosis' group (44 cases; myelomatosis, Hodgkin's disease, leukosarcoma, etc.).

- 967 THE INFLUENCE OF PARENTERAL RNA AND DNA ON THE GROWTH OF SARCOMA 180 AND EHRlich's ASCITES TUMOR IN SWISS MICE. (E.) J. C. (Dept. Surg., U. Illinois Coll. Med., Chicago) and B. McKibbin. *J. Surg. Res.* 5(1):10-15, 1965.

Female Swiss mice (age 4-6 wk.; wt. approx. 20 g) inoculated with Sarcoma 180 or Ehrlich's ascites tumor cells, the parenteral administration of heterologous RNA (125 mg/kg/day; 2 g/kg in 14 days) increased tumor "takes" by 30% as compared to controls given saline. Similar results were obtained with hydrolyzed RNA. With heterologous or DNA hydrolysate Ehrlich's ascites tumor "takes" were increased by 30% and 11%, respectively; however, no such increase was noted with Sarcoma 180 inoculation. Prior *in vitro* incubation of both sets of tumor cells with RNA (0.001-10.0 mg/ml) failed to produce an increase in tumor "takes" after subsequent inoculation into mice. The data suggest that RNA exerts its effect on tumor "takes" through an RNA:host interaction.

- 968 ACUTE MULTINODULAR SPINOCELLULAR, SPONTANEOUSLY CURABLE CARCINOMA. (Ger.) Sannicandro, F. ("Di Summa" Prov. Hosp., Brindisi, Italy). *Derm. Wschr.* 150(45):473-480, 1964.

This report is presented of a 79-year-old man with a unique form of acute multinodular, spinocellular carcinoma of the facial skin. In its histology and benign clinical development, this

tumor resembles a keratoacanthoma. The signs of spontaneous healing, which histologically had great similarity to those of keratoacanthoma, were discussed.

- 65-969 ACUTE MULTIPLE NODULAR SQUAMOUS SPONTANEOUSLY CURABLE CARCINOMA. (Fr.) Sannicandro, F. *Bull. Soc. Franc. Derm. Syph.* 71(4):477-479, 1964.

See the preceding abstract.

- 65-970 PROSTATIC CANCER OF A YOUNG PERSON WITH PRIMARY HYPOGONADISM. (E.) Nishimura, R. (Dept. Urol., Yokohama U. Sch. Med., Japan), I. Kondo and T. Oyamatsu. *Yokohama Med. Bull.* 15(2):63-70, 1964.

A case history is presented of a 34-year-old man with prostatic carcinoma and primary hypogonadism. It was suggested from assay of the urinary hormones that the endocrine environment of relative estrogenic excess may have played the leading part in pathogenesis in this patient.

- 65-971 RETICULOSARCOMA IN FISTULA FROM CHRONIC OSTEOMYELITIS. (It.) Gafa', L. (Inst. Anat., U. Catania, Italy) and G. Fontana. *Arch. Ital. Pat. Clin. Tumori* 7(1-2):31-41, 1964.

Reported is the case of a 73-year-old man who developed a reticulum cell sarcoma on the femur at the site of a chronic myelitic lesion with fistulization of long standing duration (11 yr.). A brief review (12 references) of 14 related cases is also presented.

- 65-972 OBSERVATIONS ON A CASE OF RECKLINGHAUSEN NEUROFIBROMATOSIS. (It.) Sciarra, F. (Inst. Spec. Path. Med., U. Rome), G. De Maio, G. De Sanctis and A. Piccolo. *Gazz. Int. Med. Chir.* 68(24):3732-3743, 1964.

In a patient with extensive skin manifestations and bone deformations, hormone studies showed normal thyroid and cortico-adrenal function and an increased pituitary production of STH.

- 65-973 COMBINATION OF KAPOSI'S SARCOMA OF THE LYMPH NODES WITH CHRONIC LYMPHATIC LEUKEMIA. (Rus.) Aruin, L. I. (Dept. Path. Anat., I. M. Sechenov 1st Order of Lenin Med. Inst., Moscow). *Ark. Pat.* 27(1):81-84, 1965.

No transition into lymphoblastic tissue was observed.

- 65-974 SPONTANEOUS REGRESSION OF TUMORS INDUCED IN THE RAT AFTER SUBCUTANEOUS INOCULATION OF ASCITES SP2 FIBROSARCOMA CELLS. (Fr.)

Rivière, M.-R. (Lab. Exp. Med., Inst. Sci. Res., Villejuif, Seine, France), C. Lasne and M. Guérin. C. R. Acad. Sci. (Paris) 258(10)(Group. 14): 2935-2937, 1964.

Essentially the same as CRA 3(1):#165, 1965.

65-975 CLINICAL AND HISTOLOGIC CHARACTERISTICS OF THREE CASES OF CUTANEOUS RETICULOSIS. (Fr.) Simonis, A. (Dept. Derm., Free U. Brussels, Belgium). Arch. Belg. Derm. Syph. 20(1):31-36, 1964.

A case is described of a 60-year-old man with malignant reticulosis of the right arm which developed one yr. after formation of a pyoderma gangrenosum on an anthrax scar.

65-976 SQUAMOUS CELL CARCINOMA AS A COMPLICATION OF HIDRADENITIS SUPPURATIVA. (E.) Donsky, H. J. and C. G. Mendelson. Arch. Derm. (Chicago) 90(5):488-491, 1964.

A case report.

65-977 CIRRHOSIS AND LIVER TUMOURS IN A CLOSED COLONY OF HAMSTERS. (E., Abstract) Chesterman, F. C. and A. Pomerance. Nederl. T. Geneesk. 108(49):2380, 1964.

65-978 2. DOUBLE PARASITIC INFECTION OF THE PREPUCE ASSOCIATED WITH CARCINOMA. (E.) Kovi, J. (Nat. Inst. Health Med. Res., Ghana). Ghana Med. J. 3(2):84-86, 1964.

A 30-year-old man of the Busanga tribe, Ghana, with double parasitic infection of the prepuce by Schistosoma haematobium and microfilaria was found to have a squamous cell carcinoma in the epidermis above the schistosomal infection.

65-979 COMPARISON OF PHILADELPHIA CHROMOSOME-POSITIVE AND -NEGATIVE PATIENTS WITH CHRONIC MYELOCYTIC LEUKEMIA. (E.) Krauss, S. (Roswell Park Mem. Inst., Buffalo, N. Y.), J. E. Sokal and A. A. Sandberg. Ann. Intern. Med. 61(4):625-635, 1964.

Of 28 pts. with chronic myelocytic leukemia (CML) seen from 1959-1963, 16 (7 males and 9 females) exhibited the Philadelphia chromosome, while 12 (11 males and 1 female) lacked the chromosome.

In the former group, the pts. were homogeneous in that all but 1 presented with classic CML, while the latter group of pts. included radiation-induced leukemia, eosinophilic leukemia, bone marrow failure with myeloid metaplasia and non-categorized types. It was noted that the homogeneity of the former group may represent a distinct clinical entity, probably reflecting a common etiology, while the heterogeneity of the latter group suggests multiple etiologic factors.

65-980 POLYCYTHAEMIA VERA: CLINICAL STUDIES ON A SERIES OF 127 PATIENTS MANAGED WITHOUT RADIATION THERAPY. (E.) Perkins, J. (Dept. Clin. Hemat., U. Manchester, England), M. C. G. Israëls and J. F. Wilkinson. Quart. J. Med. 33(132):499-518, 1964.

In a series of 127 pts. with polycythemia vera seen over the last 26 yr., the av. age at onset for both sexes combined was 55.2 yr. (men, 53.2 yr. and women, 57.8 yr.; range 21-80 yr.). There were no deaths from acute leukemia in the 44 pts. who died and were not treated with irradiation, while 1 out of 8 treated with irradiation (6/8 died) died of acute leukemia.

65-981 PATHOLOGICAL CHANGES OF THE STOMACH IN PRECANCEROUS STATES. (Jap.) Murakami, T. (Dept. Surg., Showa Med. Coll., Japan), A. Yasui and H. Watanabe. Nippon Rinsho (J. Jap. Clin. Med.) 22(9):1909-1915, 1964.

Gastric ulcer, polyps and chronic gastritis are discussed from an histopathological point of view with regard to their status as precancerous conditions. The authors indicated that there is still a great deal to be clarified before any positive relationship can be established between these conditions and cancer.

65-982 TRANSIENT CONGENITAL LEUKEMIA IN 7 INFANTS WITH MONGOLISM. (E.) Engel, R. R. (Dept. Pediat., U. Minnesota Sch. Med., Minneapolis), D. Hammond, D. V. Eitzman, H. Pearson and W. Krivit. J. Pediat. 65(2): 303-305, 1964.

Recoveries from congenital leukemia among children with mongolism are tabulated for 4 cases from the literature and for 3 new cases. A fairly uniform sequence of events was demonstrated. The question of why malignancy in this age group has a higher incidence of spontaneous remissions merits further consideration.

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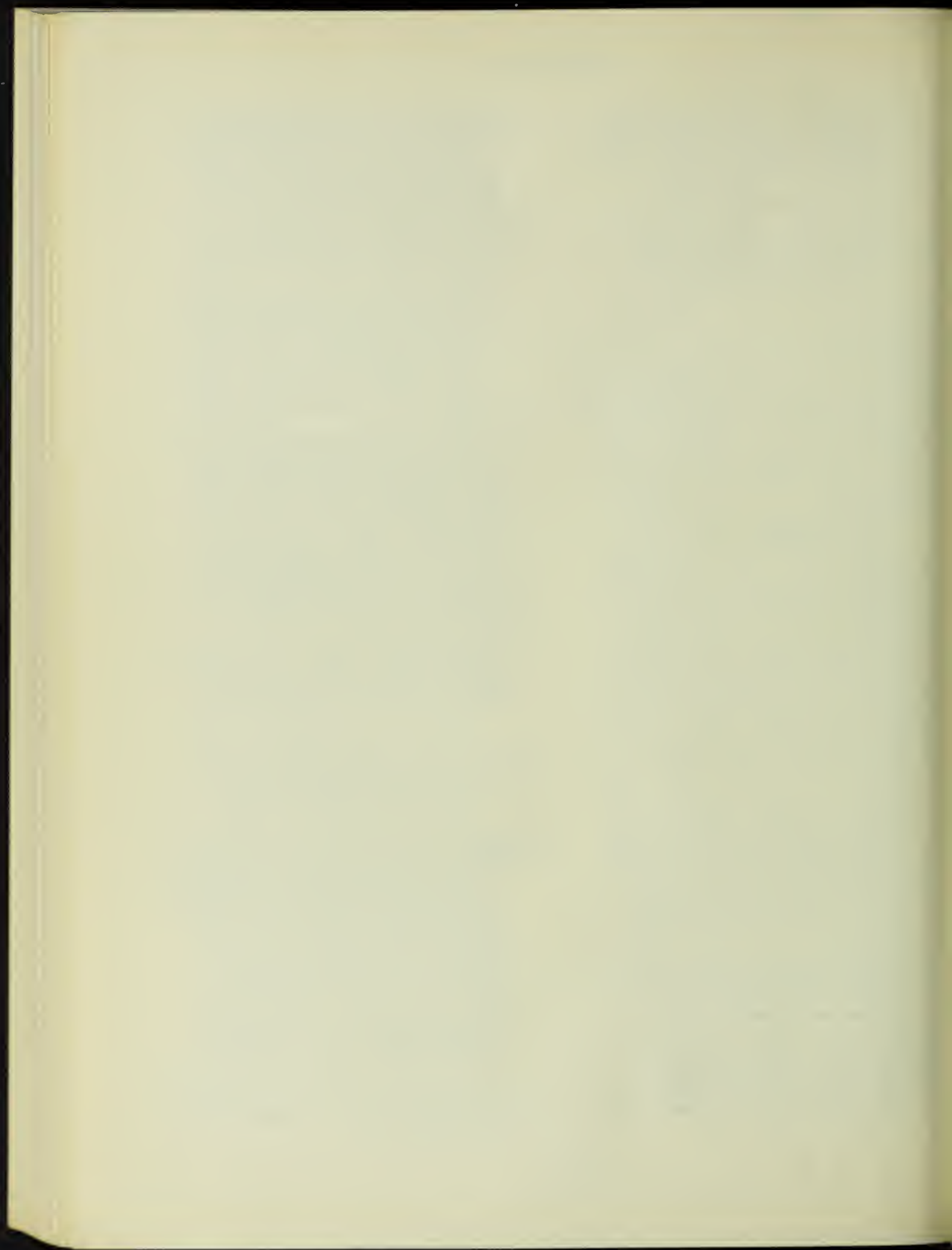
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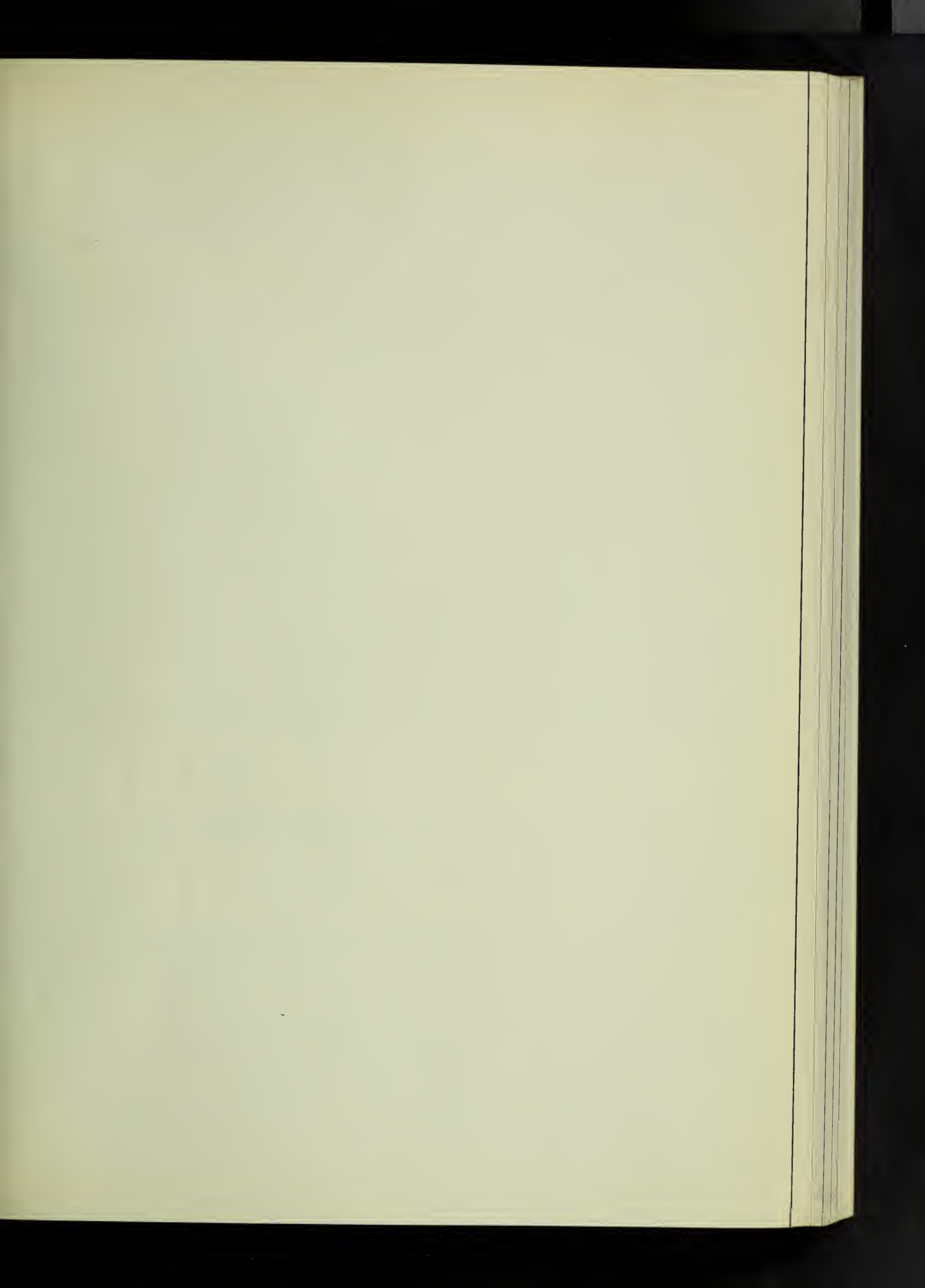
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ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	cytopathic effect	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
LD ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	lc.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	ln.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	lt.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

5-983 METABOLISM OF CARCINOGENIC AROMATIC AMINO COMPOUNDS. (Rus.) Pliss, G. B. (Inst. Oncol., USSR Acad. Med. Sci., Leningrad). Op. Onkol. 10(10):109-112, 1964.

Chemical agents could be significantly changed in the organism with its complicated enzymatic systems. The extent and the character of the change could depend on the animal type, on the nature of the aromatic amino compound itself and its physicochemical properties. Conversion is most likely by oxidation and acetylation. In the author's opinion, carcinogenic substances possess only conditional organotropy, with the exception, perhaps, of agents acting directly on endocrine glands. Pathogenic effect could be accomplished by the release of the carcinogenic metabolites from the conjugated compounds during excretion or by the action of various enzymes. Even in various genetic strains of the same species, the compound might undergo different types of changes. The literature on some carcinogenic metabolites, such as 2-amino-1-naphthol, 1-naphthylhydroxylamine, N-oxy-2-AAF, etc., is presented. (See also CRA 1(11):#1869, 1964.) (26 references)

5-984 EXPERIMENTAL ONCOLOGY IN DOGS. (Jap.) Watanabe, F. (Dept. Veterinary Med., Nagasaki U. Sch. Med., Japan), T. Matsunaga and T. Nakao. Nagasaki Iqakkai Zasshi (Nagasaki Med. J.) 39(4):418-435, 1964.

In connection with a study of the pathogenesis of transmissible venereal tumors in dogs, a review is presented of both naturally occurring and experimentally induced tumors in these animals. Included are the transplantable malignant mast cell tumor, thyroid carcinoma and oral papilloma. Among the experimental tumors discussed are connective tissue tumor and spongioblastoma induced by 20-methylcholanthrene. (138 references)

5-985 PROBLEMS OF THE ONCOGENIC SAFETY OF LIVE VIRUS VACCINES. (Rus.) Pavchenko, A. T. (L. A. Tarasevich Contr. Inst. Med. Biol. Prep., Moscow) and A. D. Al'tshtein. Op. Virus. 9(5):527-532, 1964.

A review and discussion of the safety of live viruses from the standpoint of their tumorigenicity, SV40 and avian visceral lymphomatosis viruses are discussed in some detail. (79 references)

5-986 ENVIRONMENT AND SKIN CANCER. (E.) Knox, J. M. (Baylor U. Coll. Med., Houston, Tex.), R. E. Rossman and R. G. Freeman. Pp. 15-21 in Tumors of the Skin. Cumley, R. W., McCay, D. Aldridge, S. Connelly, J. Haroz, Reiner and W. White (Eds.). Year Book Med. Publ., Inc., Chicago, 1964, 322 pp.

The epidermal and dermal injury theories of carcinogenesis and the initiation and promotion stages are reviewed and discussed. Sunlight is implicated as the major cutaneous carcinogen. (See also CRA 1(2):#184, 1963; and ibid., 3(5):#997, 1965.) (27 references)

65-987 CHANGING CONCEPTS ABOUT THE RELATION OF VIRUSES TO NEOPLASIA. (E.) Ham, A. W. (Ontario Cancer Inst., Toronto, Canada). Proc. Med. Sect. Am. Life Convention 52:112-120, 1964.

The history and the progressive development of the virus theory of carcinogenesis are briefly reviewed. The author emphasizes the experimental evidence gleaned from the isolation of the Rous, Gross and polyoma viruses, and the adenoviruses. It is suggested that cells possibly become permanently transformed by alterations in the DNA or RNA which are induced by the addition of virus DNA or RNA. (No references)

65-988 GENETIC ASPECTS OF NEOPLASIA. (E.) Klein, G. (Inst. Tumor Biol., Karolinska Inst. Sch. Med., Stockholm, Sweden). Pp. 261-268 in New Perspectives in Biology. Vol. IV. Sela, M. (Ed.). Elsevier Publ. Co., Amsterdam, 1964, 285 pp.

A review is presented of evidence supporting the theory that carcinogenesis is associated with altered cellular differentiation brought about by mutational changes in the genetic intracellular control system (ICS), which governs the responsiveness of cells to superimposed homeostatic growth controlling forces. It is believed that the ICS may be organized along the DNA-RNA-protein sequence found in other structural and functional cell units, and certain immunologic studies have indicated the ICS to be fixed in a comparatively stable manner during evolution causing it to be relatively resistant to ordinary forms of mutagenesis. Evolutionary stabilization also appears to govern the frequency of neoplasms resulting from hormonal imbalance or induced by antigenic cell variants. (See also CRA 1(9-10):#1640, 1964.) (21 references)

65-989 TRANSPLANTABLE LEUKEMIA AS AN ASCITES TUMOR: ITS HISTOGENESIS AND PROGRESS OF THE DISEASE. (E.) Nakamura, K. (Dept. Path., Fukushima Coll. Med., Japan). Nat. Cancer Inst. Monogr. (16):149-206, 1964.

A detailed discussion and review is presented on the development, histogenesis, leukemoid reaction and the tumor-host relationships of mouse leukemia. Various substances are known to produce leukemia such as 2-acetylaminophenanthrene, estrogens, and various azo dyes as well as viruses, and X-rays. The cytogenesis of thymic lymphomas is also discussed in detail (see CRA 1(1):#135, 1963). (44 references)

- 65-990 GENITAL CANCER IN JEWS. (E.) Auster, L. S. (Dept. Surg., Bronx-Lebanon Hosp. Ctr., N. Y.). New York J. Med. 65(2):266-280, 1965.

A review is presented of cancer in Jews and other religious groups. Although geographic variation in cancer incidence is seen, the author noted that there is no racial genetic immunity nor does religious affiliation protect against cancer susceptibility. Certain practices common to several religious groups seem to influence the incidence of cancer of the penis and uterine cervix. Complete circumcision performed in infancy seems to retard both of these types of cancers. The various sociologic, ethnologic, hygienic, obstetric, dietetic and hormonal factors in genital cancer were also reviewed. (103 references)

- 65-991 A REVIEW OF RECENT STUDIES ON ROUS SARCOMA VIRUS (RSV) EMPHASIZING VIRUS-CELL-HOST INTERACTIONS. (E.) Spencer, H. J. (Mary Imogene Bassett Hosp., Cooperstown, N. Y.) and V. Groupé. Ergebn. Mikrobiol. Immunitätsforsch. 38:284-311, 1964.

A detailed review is presented on recent findings concerning interactions between Rous sarcoma virus (RSV) and its host (cell or organism). Discussed are the morphological and viral aspects of tumor pathogenesis, the relative roles of the tumor cells and the virus in tumor induction, factors of host resistance to infections with RSV, the effects of humoral antibody upon infection and the subsequent development of malignant disease and the experimental chemotherapy of virus-induced Rous sarcoma. (112 references)

- 65-992 PERORAL HORMONAL CONCEPTION PREVENTION AND NEOPLASIA. (Ger.) Rieche, K. (Robert Rossle Clin., German Acad. Sci. Berlin). Deutsch. Gesundh. 19(48):2226-2231, 1964.

In a review covering various aspects of the use of various oral hormone antifertility agents (Norethynodrel, Norlutin, Lyndiol, etc.), it is felt on the basis of present knowledge it is

improbable that there should be an increase in cancer in the sense of "syncarcinogenesis". However, further studies are necessary to reveal the possible prophylactic, therapeutic or even carcinogenic activity of these substances. (55 references)

- 65-993 NATURAL DEFENSES OF THE HUMAN ORGANISM AGAINST CANCER. (Fr.) Ravina, A. Presse Med. 72(44):2585-2588, 1964.

A review of the recent literature on spontaneous regressions of malignant tumors and clinical aspects of anticancerous immunity. (7 references)

- 65-994 ZINC IN HUMAN PHYSIOLOGY AND PATHOLOGY. (Pol.) Szmigielski, S. (Inst. Hemat., Warsaw, Poland) and J. Litwin. Postepy Hig. Med. Dosw. 18(4):613-635, 1964.

A brief review of Zn as a carcinogen and of the affinity of neoplastic tissues for Zn (which property may serve for early cancer diagnosis) is presented in a general review of the role of Zn in human physiology and pathology. (See also CRA 2(3):#588, 1964.) (217 references)

- 65-995 OBSERVATIONS ON THE UNIVERSALITY OF CANCER IN THE ANIMAL WORLD. (Fr.) Lombard, C. Toulouse Med. 65(6):741-757, 1964.

In an extensive review of the types of cancer most frequently encountered in various invertebrate and vertebrate groups, it is concluded that the increasing complexity of organization constitutes a predisposing factor to cancer in the animal world. The reasons for the higher incidence of certain types of cancer in some animals or the increased resistance demonstrated by others cannot as yet be explained. The study of cancer in the animal world demonstrates the complexity of the etiology of cancer. Viruses, heredity, endocrine and nutritional factors, either singly or combined all seem to play an essential role in the development of various cancer conditions. (See also CRA 3(4):#898, 1965.) (No references)

See also abstract no.: 997

PHYSICAL CARCINOGENESIS

996 CARCINOGENIC ACTION OF HIGH ENERGY PROTONS. (Rus.) Strel'tsova, V. N., I. Moskalev and I. K. Petrovich. Vop. Onkol. 9:74-77, 1964.

Received a single irradiation with protons (0 and 500 MeV energy) in doses of 25-850 rad. Frequency and the spectrum of most of the plasmas which developed were significantly higher in treated than in controls. Total tumor frequency and the number of cases of multicentricity were significantly higher in females than in males. Mammary, genital and hypophyseal tumors prevailed in females, while males showed more s.c. tissue tumors. A correlation between frequency and rate at which mammary tumors appeared and the amount of the absorbed dose was found at 10-14 mo. after irradiation (500 MeV), not after 18 mo. Minimal carcinogenic dose for mammary tumors was 25-50 rad and for myeloid leukemia and thyroid tumors (500 MeV) was in the range of 250 rad. The total frequency of mammary tumors at dose 500-800 rad was lower than at 400 rad. When compared with controls not only the frequency of leukemia increased but the latent period was also shortened. Leukemias developed on av. days 562 and 432 after irradiation with 250 and 300 rad (500 MeV), resp. In males and females, after irradiation with 25-400 rad plasmas of the endocrine and mammary glands and other organs occurred; after irradiation with 800 or more rad there was an increase in g.i. tract tumors, s.c. tissue sarcomas, kidney tumors, etc. Some other tumors noted included adenocarcinomas of the uterus, liver and intestine; lymphomas of the liver and s.c. tissue; seminoma and lymphosarcoma. Irradiation with protons at 500 MeV had no effect on the qualitative composition of the tumor spectrum.

997 BIOCHEMICAL ALTERATIONS FOLLOWING ULTRAVIOLET EXPOSURE TO THE SKIN. (Jap.) Knox, J. M. (Baylor U. Coll. Med., Houston, Tex.) and R. M. Ogura. Nippon Hifuka Gakkaishi (Jap. J. Derm.) 73(12):725-730, 1964.

General discussion of experimental findings of biochemical reactions of skin after irradiation of ultraviolet or sunlight and their possible implications for the skin cancer are presented. In this review paper (47 references) on the effects of UV rays, the authors' contributions may be summarized as follows: The incidence of skin cancer was decreased by prior application of sunscreen agent to the skin, thus indicating that UV rays possess some carcinogenic activity. Mutations of SH- and SS- groups were observed following exposure to UV rays in humans and rats.

998 RADIATION CANCER. CARCINOMAS OF THE LARYNGOPHARYNGEAL REGION. (Jap.)

Matsuoka, R. (Jikeikai Coll. Med., Japan). Jibiinkoka (Otolaryngology, Tokyo) 7(3):284-287, 1964.

Fifteen pts. (10 males, 5 females; age 28-62 yr.) developed laryngopharyngeal carcinomas after radiation therapy for cervical tuberculous adenitis (14 pts.) and hemangioma of the thyroid (1 pt.). Cancer sites were larynx (3), lower pharynx (8), tonsil (3) and thyroid (1); latent period ranged from 18-35 yr. All cases were squamous cell carcinoma except for 1 case of adenocarcinoma of the thyroid. The approx. radiation dose (calculated for 8 cases in which reasonably satisfactory information was obtained) was 6,900 r (skin) and 5,600 r (thyroid).

65-999 CARCINOMA OF THE UTERUS IN A BEAGLE. (E.) Andersen, A. C. (Dept. Radiopath., U. California Sch. Vet. Med., Davis). J. Am. Vet. Med. Assn. 143(5):500-502, 1963.

A purebred female Beagle underwent 4 whole body X-ray exposures (total, 300 r) at the age of 11 mo., whelped 2 litters, and died at the age of 10 yr. with a carcinoma of the uterus which had metastasized widely. Since uterine carcinoma is rare in dogs, these findings may reflect a possible long-term effect of ionizing radiation.

65-1000 CHRONIC EFFECTS OF INHALED PLUTONIUM IN DOGS. (E.) Park, J. F. (Hanford Lab., General Electric Co., Richland, Wash.), W. J. Clarke and W. J. Bair. Health Phys. 10(12):1211-1217, 1964.

Of 40 beagle dogs given single 10-30 min. exposures to Pu²³⁹⁰² aerosols, 8 died 28-48 mo. post-exposure and the body burdens at death were approx. 0.1-3 µC with about 35-75% of the body burden in the lungs, while 20-50% was in the bronchial and mediastinal lymph nodes; in the liver, the range was 2-10% and 1-4% was also found in the bone. Pathologic changes included fibrotic and metaplastic changes in the lungs and fibrosis of the lymph nodes. Pulmonary neoplasms were detected in 4 dogs. (See also CRA 2(3):#436 and ibid., (7):#1253, 1964.)

65-1001 EFFECT OF β -IRRADIATION ON THE DEVELOPMENT OF MOUSE SKIN CANCER, INDUCED BY 9,10-DIMETHYL-1,2-BENZANTHRACENE (DMBA). (Rus.) Kim, V. Kh. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Vestn. Akad. Med. Nauk SSSR 19(11):36-40, 1964.

Twenty three wk. after the initiation of treatment 143 papillomas (P) were found in 27/50 mice treated with DMBA (0.03% soln. in benzene, total 0.11 mg in 21 wk., topical) + β -irradiation (non-carcinogenic dose), and 108 P were found in 20/24

treated with DMBA alone. The survival time of mice treated by combined treatment was 42 wk.; by DMBA alone 48 wk.; and by irradiation alone, at the end of the experiment, 14/40 were still living. Therefore, β -irradiation stimulated the carcinogenic effect of DMBA. This effect increases with an increase in the irradiation dose, and was especially pronounced when DMBA conc. was low (0.01% soln.). Single, subtotal X-ray 1 mo. prior to treatment with DMBA (0.05% soln. in benzene xl/wk. x 33 wk., topical) markedly inhibited the formation and development of the tumors. However, this effect was less marked in other experiments.

- 65-1002 EMPIRICAL ESTABLISHMENT OF CANCER--ASSOCIATED DOSE TO THE LUNG FROM ^{144}Ce . (E.) Cember, H. (Northwestern U., Tech. Inst., Evanston, Ill.). Health Phys. 10(12):1177-1180, 1964.

Lung clearance studies of radiocerium given to rats by intratracheal inj. of $\text{Ce}^{144}\text{F}_3$ particles or as a $\text{Ce}^{144}\text{Cl}_3$ soln. are presented. (The tumor incidence results for the intratracheal inj. are presented in CRA 1(8):#1445, 1963 and *ibid.*, 2(1):#29, 1964, while the results for the cerium soln. are reported in CRA 2(2):#197, 1964.) On the basis of these studies the organ mean radiation dose during survival was found to be a biologically meaningful gauge for predicting the likelihood of lung tumor induction from radioactive particulates deposited in the lung.

- 65-1003 RADIATION-INDUCED CARCINOMA OF THE MASTOID. (E.) Beal, D. D. (Dept. Otolaryng., U. Chicago, Ill.), J. R. Lindsay and P. H. Ward. Arch. Otolaryng. (Chicago) 81(1): 9-16, 1965.

The fatal course of 2 radium dial painters (women, 52 and 53 yr. old) who developed epidermoid carcinoma of the mastoid is presented. Both used their lips to tip the radium-laden brush. The predilection of the mastoid for carcinogenesis in radium poisoning is probably due to the radiation effect of the radioactive particles of the radium deposited in the bones and the fact that in the mastoid air cells, the mucosa is directly applied to the bony septa.

- 65-1004 CUTANEOUS NEOPLASMS IN THE RAT PRODUCED BY GRENZ RAY AND 80 KV X-RAY. (E.) Zackheim, H. S. (Dept. Derm., Wayne State U. Sch. Med., Detroit, Mich.), E. Krobok and L. Langs. J. Invest. Derm. 43(6):519-534, 1964.

In rats, basal and squamous cell carcinomas and fibrosarcomas were produced by grenz ray (GR; 10-15 kv) or 80 kv of X-ray. The effective single doses of GR ranged from 5000-9000 r and the av. appearance time for the carcinomas was 12.6 mo. (squamous) and 14.3 mo. (basal), while for the

fibrosarcomas it was 14.7 mo. The effective weekly (300-600 r) schedules of GR totaled 7800-26,400 r and the av. appearance time for the carcinomas was 15.5 (squamous) and 16.3 mo. (basal) no fibrosarcomas occurred. The effective single doses of X-ray ranged from 1000-2000 r; the monthly schedules totaled 2500-7000 r; weekly schedules totaled 3,900-10,200 r. The av. appearance times with all combined X-ray schedules were squamous cell carcinomas 10.9 mo., fibrosarcomas 12.0 mo. and basal cell carcinomas, 13.5 mo. No metastases occurred.

- 65-1005 STUDIES OF X-RAY-INDUCED LEUKEMIA IN MICE. REPORT I. (Jap., Abstract) Kaneno, M. (Dept. Pediat., Mie Pref. Coll. Med., Japan), M. Izawa, K. Nakakugi and Y. Nishizuka. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):61, 1964.

The relationships between various carcinogenic phases and histopathologic changes, and preleukemic changes in the systemic lymph nodes, were studied in X-ray induced leukemia in C57BL, (A/Jax x AKR)F₁, and (AKR x A/Jax)F₁ mice and were compared with the changes observed in spontaneously occurring leukemia in AKR and SL mice.

- 65-1006 RESEARCH ON X-RAY INDUCED LEUKEMIA IN RF MICE. V. ACCELERATION AND INHIBITION OF THE DEVELOPMENT OF LEUKEMIA. (Jap., Abstract) Irino, S. (Dept. Intern. Med., Okayama U. Sch. Med., Japan), K. Ikejiri, N. Soda and M. Suzuki. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):24, 1964.

The effect of thymectomy and/or splenectomy on X-ray-induced (350 r single radiation) leukemia was investigated. The incidence of leukemia in thymectomized RF mice was 50% (5/10); that in splenectomized mice, 63.6% (7/11); that in both thymectomized and splenectomized mice, 0% (0/8); and that in control mice (no surgery) was 77.3% (41/53). The authors stated that the results indicate a two-step process in the production of leukemia. (See also CRA 1(7):#1343, 1963, and *ibid.*, (12):#2071, 1964.)

- 65-1007 THE EXPERIMENTAL INDUCTION OF LEUKEMIA BY INTERNAL IRRADIATION. (Jap., Abstracts) Takizawa, S. (Dept. Path., Hiroshima U. Sch. Med., Japan) and K. Yokoji. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):60-61, 1964 and 27(2-3):260, 1964.

Two strains of mice (RF and C57BL) were employed which are known to respond to external irradiation with high incidences of leukemia. The internal source of irradiation employed was p^{32} , 0.5 $\mu\text{C/g}$ i.v. or i.p., 2x/wk. for 5 wk. In RF mice (age 10 wk. at start) leukemia developed in 75% approx 77 days or longer after end of admin. The leukemia which developed early (77 days) was of

mic origin whereas that which appeared later (6 days) originated in the mesentery. In female RF mice leukemia (thymic origin) developed earlier and at a higher rate than in males. The leukemia in RF mice was chiefly lymphatic and 100% transplantable to mature RF mice or newborn mice of other strains. No myeloid leukemia developed. In C57BL mice (age 5 wk. at start) leukemia developed during an observation period of 14 mo.

1008 TUMOR CLINIC CONFERENCE. (E.) Cole, W. H. (Dept. Surg., U. Illinois Coll., Chicago). Cancer Bull. (Texas) 16(5): 37, 1964.

Case history is presented of a 6-year-old boy with papillary adenocarcinoma of the thyroid who had undergone irradiation to the neck for whooping cough at the age of 13 wk. The author is convinced that there is a relationship between radiation therapy in infancy and development of thyroid cancer. Of 10 observed children with thyroid cancer, all had had X-ray therapy to the neck or upper mediastinum in infancy.

1009 CARCINOMA OF THE MAXILLARY SINUS WITH RESIDUAL THOROTRAST. (E.) Poushter, D. (Dept. Otolaryng., State U. New York, Syracuse) and T. Perl. Laryngoscope 75(1):74-83, 1965.

Case reports are presented.

1010 POST-IRRADIATION SARCOMA OF BONE. (Cz.) Holan, J. Cesk. Radiol. 19(1):61-66, 1965.

Report and review (38 references).

1011 X-RAY DOSE-DEPENDENT SUPPRESSION OF URETHAN LUNG TUMORIGENESIS IN MICE. (Abstract) Foley, W. A. (Dept. Path., University of Minnesota, Minneapolis) and L. J. Cole. Fed. Proc. 24(2)(Pt. 1):494, 1965.

65-1012 A TRANSPLANTABLE MESOTHELIOMA INDUCED BY ASBESTOS. (E., Abstract) Smith, W. E. (Health Res. Inst., Fairleigh-Dickinson U., Madison, N. J.) and R. E. Elsasser. Fed. Proc. 24(2)(Pt. 1):550, 1965.

65-1013 HISTOGENESIS AND ALKALINE PHOSPHATASE ACTIVITY (AP) OF RADIATION- AND VIRUS-INDUCED LYMPHOMAS OF C57BL MICE. (E., Abstract) Lagerlöf, B. (Dept. Radiol., Stanford U. Sch. Med., Palo Alto, Cal.) and H. S. Kaplan. Fed. Proc. 24(2)(Pt. 1):684, 1965.

65-1014 COMPARISON OF THE EFFECTS OF 10 MEV PROTONS AND 40 MEV ALPHA PARTICLES ON INDUCTION OF MALIGNANT NEOPLASMS IN MOUSE SKIN. (E., Abstract) Lippincott, S. W. (Dept. Path., Bowman Gray Sch. Med., Winston-Salem, N. C.), J. E. Jesseph, C. P. Baker and J. H. S. Foushee. Proc. Am. Assn. Cancer Res. 6:41, 1965.

65-1015 MOUSE HEPATOMAS: INCREASED INCIDENCE AFTER LOW-DOSE-RATE GAMMA IRRADIATION. (E., Abstract) Nowell, P. C. (Dept. Path., U. Pennsylvania Sch. Med., Philadelphia) and L. J. Cole. Proc. Am. Assn. Cancer Res. 6:49, 1965.

65-1016 PATHOGENESIS OF MURINE RADIATION LYMPHOMA. (E., Abstract) Siegler, R. (Cancer Res. Lab., Albert Einstein Med. Ctr., Philadelphia, Pa.) and M. A. Rich. Proc. Am. Assn. Cancer Res. 6:59, 1965.

65-1017 PATHOLOGICAL AND ANGIOGRAPHIC EFFECTS OF URETHAN AND LOCALIZED ROENTGEN IRRADIATION ON RAT INTESTINE. (E., Abstract) Zaldivar, R. S. d. (Dept. Radiat. Biol., U. Rochester, N. Y.) and G. W. Casarett. Proc. Am. Assn. Cancer Res. 6:70, 1965.

65-1018 X-RAY-INDUCED SARCOMAS IN THE GUINEA PIG. (Fr., Abstract) Maggiora, A. and J. Lilla. Bull. Soc. Franc. Derm. Syph. 71(3):352-353, 1964.

See also abstract nos.: 986, 1147, 1211, 1212, 1224, 1225, 1226

CHEMICAL CARCINOGENESIS

- 65-1019 MORPHOLOGICAL STUDIES OF LUNG TUMORS EXPERIMENTALLY INDUCED IN MICE BY INTRAPERITONEAL INJECTION OF URETHAN. CHAPT. 4: CHANGES IN THE LUNG TISSUE CAUSED BY TRANSPLACENTAL URETHAN. (Jap.) Daido, S. (Dept. Surg., Kyoto U., Japan). Kyoto Daigaku Kekkaku Kenkyusho Kiyo (Bull. Res. Inst. Tuberc., Kyoto U.) 12(1): 65-81, 1963.

In order to elucidate the genetic origin of the three types of cells (cells containing osmiophilic bodies in the cytoplasm, cells possessing cilia on their surface, and cells having no osmiophilic bodies or cilia) observed in urethan (U)-induced lung adenoma in mice, 0.4 cc of 5%-10% U soln. (20-40 mg/day 5-9 times) was given i.p. to approx. 10-day pregnant dd mice. In the case of mice older than 12 wk., benign adenomas were observed on the pleura on gross inspection. Electron microscopic studies showed that the tumor consisted of all 3 types of cells; these were shown to originate from terminal alveolar cells and not from bronchial cells. Where no tumor formation had occurred an increased proliferation of alveolar wall cells was observed. In fetal lung, where U was transmitted via the placenta, it appeared that the tumor had derived from undifferentiated mother cells of the alveolar epithelium. The author feels on the basis of his findings that this U-induced lung adenoma developed from cells of the alveolar wall and that in the process of tumor formation, other types of cells developed from undifferentiated mother cells in the alveolar series or from even other undifferentiated earlier cells in the alveolar-bronchial series.

- 65-1020 THE METABOLISM OF AROMATIC AMINES. (E., Abstract) Booth, J. and E. Boyland. Pp. 66-67 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

- 65-1021 A COMPARISON BETWEEN A CARCINOGENIC AND A NON-CARCINOGENIC DERIVATIVE OF TCQ. (E., Abstract) Cunningham, G. J., J. Chayen, J. V. Diengdoh, G. R. N. Jones, M. McCabe and S. J. Surtees. P. 278 in British Empire Cancer Campaign 1963. Part 2: Scientific Report. British Empire Cancer Campaign Research. London, S.W.1, 707 pp., 1963.

The carcinogenic (3-Me-TCQ) and the non-carcinogenic (2-Me-TCQ) tricycloquinazoline (TCQ) derivatives caused some increase in 6-phosphogluconate dehydrogenase after 2 days and this was enhanced in skin painted with the former by day 6 after the initial admin. About 2 days after painting with 3-Me-TCQ, an increase was seen in the staining for nucleic acids and autoradiography showed that the changes in methyl green staining were due to a single period of DNA synthesis. Incorporation of tritiated thymidine occurred only during the 24-48-hr. period after the skin painting of

3-Me-TCQ, while 2-Me-TCQ had no effect on the take. (See also CRA 1(8):#1532, 1963.)

- 65-1022 EFFECT OF OVARECTOMY UPON THE INFLUENCE OF ETHIONINE ON THE INDUCTION OF MAMMARY TUMORS. (E., Abstract) McLeod, M. (Dept. Path., U. North Carolina Sch. Med., Chapel Hill) and W. R. Benson. Lab. Invest. 13(8):951-954, 1964.

In ovariectomized Wistar rats, feeding of ethionine (25 mg/100 g body wt.) for 12 days plus 2-acetylaminofluorene (0.04 mg/100 g of food) for 20-25 days resulted in only 3 (8%) mammary tumors at 375 days whereas in previously reported work at this stage there would have been 14 (56%) mammary tumors.

- 65-1023 EFFECT OF TERPENES ON BENZOPYRENE-INDUCED CANCER IN THE MOUSE. (Hun.) Benkő, J. (Int. Clinic #1, U. Med., Szeged, Hungary), T. Tiboldi and J. Bárdos. Magy. Onkol. 7(4): 209-214, 1963.

Instillation into the skin on alternate days of a mixture of terpenes (T; containing pinene, d-limonene, reinterpene, borneol, anetol, fenchon, cineol and "ruby" glycoside) and 3,4-benzpyrene (BP; 0.5%) reduced the incidence of BP-induced carcinoma to 33% (compared to 85% in BP-only controls) and also increased the latent period. T alone did not induce cancer but caused a phenomenon described as "restless epithelium" in the skin of the animals.

- 65-1024 EXPERIMENTAL STUDIES ON ZINC METABOLISM IN THE PROSTATIC GLAND. PART III. EXPERIMENTAL NEOPLASM OF THE PROSTATIC GLAND. (Jap.) Hirayama, M. (Dept. Urol., Hiroshima U. Sch. Med., Japan). Hinyokika Kiyo (Acta Urol. Kyoto) 10(9):584-594, 1964.

20-Methylcholanthrene (0.1 ml, 3% soln.), injected into the frontal lobe of the prostate of 50 Wistar rats (wt. approx. 70 g) after 150-200 days induced tumors in 20/38 survivors; tumors included 1 adenocarcinoma and 16 squamous cell carcinomas, and 3 sarcomas. The rate of Zn^{65} uptake by the tumors 24 hr. after intracardiac admin. of 0.4 μ C/g of $Zn^{65}Cl_2HCl$ was 2-3x greater than that in the control prostatic tissue. The reduction in the level of Zn^{65} was more gradual in the squamous cell carcinoma than in the blood; 15-16 days were needed to reduce activity by 50%. In tumor-bearing rats, the adrenal glands were the only other organs showing increased Zn^{65} uptake accompanied by an increase in wt.

- 65-1025 ESTRONE-INDUCED MAMMARY TUMORS IN THE RAT. II. EFFECT OF ALTERATIONS IN

MONAL ENVIRONMENT ON TUMOR INDUCTION, BEHAVIOR, AND GROWTH. (E.) Cutts, J. H. (Cancer Res. Lab., Western Ontario, London, Canada). Cancer Res. (7):1124-1130, 1964.

more detailed account of the paper abstracted in CRA 1(5):#873, 1963. (See also CRA 3(1):#100, 1965.)

1026 TUMOR INDUCTION IN TRANSPLANTED MAMMARY GLANDS IN RATS. (E.) Dao, T. L. (Roswell Park Mem. Inst., Buffalo, N. Y.), Tanaka and D. Gawlak.. J. Nat. Cancer Inst. (6)(Pt. 2, Suppl.):1259-1275, 1964.

Female Holzman rats were fed a single dose of 9,10-dimethyl-1,2-benzanthracene (20 mg in 1 ml of olive oil) and their mammary glands were removed subsequently (4 hr., 24 hr., 5 days or 10 days) and transplanted into female recipients, mammary cancer developed in the host mammary grafts. The incidence of tumors was significantly lower in mammary grafts from male donors than from female donors. Among the mammary tumors in 45 rats, 17 were adenocarcinomas, 1 was a sarcoma, and 3 were fibroadenomas; mammary hyperplasia occurred in 7 grafts. In 5 recipients bearing mammary cancer and grafts that had developed tumors, ovariectomy caused the tumors to decrease in size which indicated that the tumors were hormone dependent.

1027 INDUCTION IN RF MICE OF MYELOGENOUS LEUKEMIA BY ORAL ADMINISTRATION OF 2-METHYLCHOLANTHRENE AND THE CO-LEUKEMOGENIC ACTION OF CROTON OIL. (Jap.) Irino, S. (Dept. Intern. Med., Okayama U. Sch. Med., Japan), Sezaki and I. Ko. Igaku To Seibutsugaku (Med. J., Tokyo) 68(5):206-212, 1964.

RF strain mice (4-6 wk. old; male:female = 1:1) given oral admin. of 20-methylcholanthrene (MC; 0.1-0.15 mg of a 0.4% olive oil soln. 3x/wk.) induced myeloid leukemia (ML) in 1/6 (17%), fibrosarcoma in 1/6 and lung adenoma in 1/6 mice after a latent period of 112 days; similar application of 0.8% croton oil induced ML in 8/16 (50%) mice after an av. latent period of 72.3 days and lymphatic leukemia (LL) in 2/16 (12.5%) after an av. latent period of 73 days. In contrast, the combination of 0.8% croton oil (as above) + 5% croton oil (benzene soln.; topical admin. by 1 or 2 brush strokes 2x/wk.) induced ML in 11/18 (61.1%) after an av. latent period of 46.5 days and LL in 1/18 (5.5%) mice after a latent period of 57 days. The rate of incidence of leukemia was not significantly increased by the simultaneous application of croton oil but the latent period was significantly shortened by approx. 4 wk. Croton oil application alone failed to induce tumors.

1028 LIVER GLUCOSE-6-PHOSPHATASE AND GLUCOKINASE ACTIVITIES IN DAB FED RATS. (Jap.) Asano, K. (Dept. Intern. Med., Okayama U.

Sch. Med., Japan), M. Ishikawa and E. Fukatsu. Igaku To Seibutsugaku (Med. Biol., Tokyo) 68(6):294-297, 1964.

In order to clarify glycolytic activity during carcinogenesis, an unspecified number of male Wistar Daikoku rats (70-100 g) were fed a diet containing rice (80%), casein (18%), olive oil (2%) and DAB (0.06%). After feeding, the animals were sacrificed at 30-day intervals, and liver glucose-6-phosphatase (G-6-Pase) and liver glucokinase (GK) were determined in both hepatoma and non-hepatoma tissue. Results showed a decrease in G-6-Pase which was already noticeable at day 30; its av. level in hepatoma and non-hepatoma tissues at day 120 was 89 U and 220 U, resp., as compared with an av. of 442 U in control liver (rats not fed DAB). The GK, on the other hand, decreased up to day 30, but increased thereafter, and its av. level in hepatoma and non-hepatoma tissue at day 180 was 3.4 U and 2.5 U, resp., as compared with an av. of 0.6 U in control liver tissue. A possible acceleration of glycolysis in DAB hepatoma is suggested.

65-1029 THE EFFECTS OF PARTIAL HEPATECTOMY ON MAMMARY CARCINOGENESIS IN THE RAT. (E.) Bolasny, B. L. (Dept. Surg., U. Chicago Sch. Med., Ill.), S. E. Warren and J. Van Prohaska. J. Surg. Res. 4(11):510-512, 1964.

Of 228 virgin 50-day-old female Sprague-Dawley rats (255-267 g) which were treated by gastric intubation of 20-methylcholanthrene (MC; 10 mg 6x/wk. for 50 days), 80/228 were subjected to partial (65%-75%) hepatectomy (PH) and 92/228 were sham operated (SO; laparotomy) at various intervals relative to the admin. of MC. All animals were sacrificed at 120 days. The admin. of MC markedly increased operative mortality during PH, but did not significantly interfere with liver regeneration. The data indicate that mammary carcinogenesis was enhanced when either operation was performed early (day 0 (1 day before) of MC or day 10 of MC treatment; 95% and 93% tumors, resp.). This tendency was reversed when the procedures were performed nearer to the expected time of tumor appearance (days 25 or 50 of MC treatment; 100% and 93% tumors, resp.). Tumor incidences after SO on days 0, 10, 25 and 50 were 94%, 100%, 90% and 100%, resp. PH might exert its inhibitory effect on carcinogenesis by causing greater tissue regeneration, which is possibly in competition with the developing tumor for essential metabolites.

65-1030 ESTABLISHMENT OF ASCITES HEPATOMA. (Jap.) Odashima, S. (Dept. Path., Sasaki Res. Inst., Japan). Nagasaki Igakkai Zasshi (Nagasaki Med. J.) 38(6):428-448, 1963.

Extensive studies on the transplantability of various hepatomas in rats are reported. The hepatomas employed in these studies included hepatomas, both ascitic and nodular, which were

induced by o-aminoazotoluene (AAT), 4-dimethylaminoazobenzene or 3'-methyl-4-dimethylaminoazobenzene (3'Me-DAB). In one experiment 4 groups of rats (25-30 rats in each group) were fed 0.05% 3'Me-DAB for 3-6 mo. At the end of 11 mo. hepatomas developed in 60% of those fed for 3 mo. and in 92% of those fed for 4 mo. After 10 mo. 100% developed hepatoma after 3-Me-DAB feeding for 5 mo. and 100% at the end of 9 mo. after feeding for 6 mo.

65-1031 COMPARATIVE OBSERVATIONS OF EXPERIMENTAL CERVICAL CANCER IN RATS AND HUMAN CERVICAL CARCINOMA. (Jap., Abstract) Hosokawa, T. (Jikeikai Coll. Med., Japan), M. Iwata, N. Tsutsumi and M. Aoyagi. Nippon Sanka Fujinka Gakkai Zasshi (J. Jap. Obstet. Gynec. Soc.) 16(8):699-700, 1964.

Topical application of 1% 3,4-benzpyrene (BP) to the cervix in a total of 300 C₃H mice induced tumor formation but no metastases in approx. 28% of the animals. The tumor formed was either nodular or polypoid in contrast to human cervical carcinoma which is either ulcerative or infiltrative. Its ability to cause debilitation and to shorten the survival time indicated the malignant nature of the tumor. The following sequential changes were observed: normal cervix; inflammatory change; atypical epithelial change; and carcinoma. In a discussion, Y. Okamura stated that daily topical application of BP to the cervix of ddN mice, combined with s.c. inj. of estradiol (10 γ /wk.), induced destructive infiltrative lesions in s.c. tissue and rectal mucosa with metastases to the lymphatic system, lungs and kidneys. It is concluded that human carcinoma of the cervix and experimental carcinoma of the cervix in mice are quite different in their pathogenesis.

65-1032 EFFECT OF POLYHYDROXY-ALKYLPTERINS ON THE DEVELOPMENT OF LIVER CANCERS IN THE RAT FED WITH 4-DIMETHYLAMINOAZOBENZENE. (E.) Sasaki, H. (Inst. Med., Sasaki Found., Tokyo), S. Nagase, C. Fujimaki and S. Odashima. Gann 55(4):297-304, 1964.

A total of 200 immature male Donryu rats received the following treatments: Group I, 4-dimethylaminoazobenzene (DAB; 0.06%) + rhamnoperin (R, 2-amino-4-hydroxy-6-trihydroxybutyl-L-erythro-pteridine; 0.5%) fed in the diet for 5 mo., then R diet for 3 mo.; Group II, DAB diet for 2.5 mo., followed by DAB + R diet for 2.5 mo. and R diet for 3 mo.; Group III, DAB diet for 5 mo., followed by R diet for 3 mo.; Group IV, DAB diet for 5 mo. The final incidence of liver tumors after 12 mo. was 10/29 (34%), 25/35 (71%), 41/41 (100%), and 32/33 (97%) in Groups I, II, III and IV, resp. The results showed that the addition of R to DAB diet caused a decrease in the incidence of liver cancer. Histologically the liver tumors were classified as typical hepatoma or the

intermediate type, cholangiocarcinoma and carcinoma simplex. The incidence of lung and lymph node metastases has shown no evident correlation among the different treatments. In related experiments, glucopterin (2-amino-4-hydroxy-6-tetrahydroxybutyl-D-erythro-pteridine) and succinic acid had no effect on the azo dye carcinogenesis.

65-1033 TISSUE CULTURE OF EXPERIMENTAL BLADDER TUMOR. (Jap., Abstract) Hosoda, T., K. Shinkai, E. Okada, Y. Hatoya and Y. Kondo. Nippon Hinyokika Gakkai Zasshi (Jap. J. Urol.) 55(8):764-765, 1964.

A single submucosal inj. of 2% 4-nitroquinoline N-oxide (2% Methocel suspension) into the bladder of Wistar Daikoku rats was followed 34 wk. later by the appearance of bladder carcinoma (Grade I according to Bonser's classification), which in turn could be cultivated by the simplified replicate tissue culture method. A histological description of the growth of this tissue in the culture is presented.

65-1034 MURINE MAMMARY CARCINOMAS INDUCED BY INTRAVAGINAL APPLICATIONS OF METHYLCHOLANTHRENE IN MINIMAL DOSAGES. (E.) Yang, Y. (Dept. Path., U. Ottawa Sch. Med., Ontario, Canada) and J. S. Campbell. Canad. Med. Assn. J. 91(20):1061-1063, 1964.

Mammary cancer occurred in 5/80 virgin ICR Swiss mice and 2/52 phenotypically normal pituitary dwarf strain mice of Bar Harbor origin (2-3 mo. old) following 1-30 intravaginal applications of 20-methylcholanthrene (MC; total 2.0-5.5 mg) over periods of 1-15 wk. Twenty-two of these 132 MC-treated mice had lower genital tract cancer. Among 106 acetone-treated Swiss mouse controls, one developed mammary cancer. No genital tract or mammary cancer occurred in mice receiving <2.0 mg MC. Mammary cancers appeared 65-167 days after beginning of treatment. This study provides additional examples of carcinogenesis in organs remote from sites of carcinogen treatment with dose close to threshold levels for treated tissues. (See also CRA 3(2):#270, 1965.)

65-1035 MAMMARY TUMOURS AND LEUKAEMIA INDUCED WITH DIFFERENT DOSES OF METHYLCHOLANTHRENE IN PSEUDOPREGNANT MICE OF THE C57BL/Cb/Se SUBSTRAIN. (E.) Bonser, G. (U. Leeds, England), C. Biancifiore, F. Caschera and F. E. Santilli. Lavori Ist. Anat. Univ. Perugia 24(2):69-74, 1964.

A total of 130 pseudopregnant female C57BL/Cb/Se mice (8 wk. of age) were admin. intragastrically 20-methylcholanthrene (MC; 0.5% soln. in almond oil; 15-48 mg in 4-24 wk.). The mice were separated into 5 groups according to dosage schedule; all groups showed an increased incidence of mammary tumors and leukemia which apparently was not dependent upon total dose or duration of treatment.

the highest incidence of mammary carcinoma (33%), with an av. induction time of 23 wk., occurred in the group admin. 1.0 mg of MC 2x/wk. for 15 wk. However, due to an increased survival time, a mammary tumor incidence of 19%, with an av. induction time of 35 wk., was noted in mice admin. 1 mg of MC every 2 days for 30 days. The highest incidence of leukemia (69%) occurred in mice admin. 1 mg MC 3x/wk. for 10 wk. followed by 1 mg 2x/wk. for 9 wk. (total 48 mg). The av. induction time of mammary carcinoma in the 5 groups ranged from 13 to 35 wk. Other tumors included 4 squamous cell carcinomas of the forestomach which developed in 27 wk., and 1 skin papilloma.

1036 ON THE MODE OF ACTION BY WHICH THE CARCINOGEN DIMETHYLNITROSAMINE INHIBITS PROTEIN SYNTHESIS IN THE LIVER. (E.) Mizrahi, J. (Dept. Biochem., Netherlands Cancer Inst., Amsterdam) and P. Emmelot. *Biochim. Biophys. Acta.* 2:362-364, 1964.

Post-mitochondrial fractions (12,000 x g supernatant) and ribosomes were prepared from the livers of male UxR-Amsterdam rats (wt. 250-300 g) which were inj. i.v. with dimethylnitrosamine (DMNA; 100 mg/kg) 2-5 hr. before sacrifice. When polyuridylic acid (100-800 μ g) was added to the liver preparations, the incorporation of [14 C]phenylalanine was seen to be stimulated to a greater extent in DMNA preparations than in normal controls. The results indicated that messenger RNA was lost from polyribosomes in the DMNA preparations. Analysis of the ribosomal components using sucrose gradient centrifugation showed a decrease in number and size of ribosomal aggregates and an increase in the number of smaller aggregates and ribosomal monomers (80 S) occurring in the DMNA-liver as compared with normal liver preparations. Since there is no evidence of increased ribonuclease activity in the DMNA post-mitochondrial fraction, it is believed that the loss of messenger RNA from the polyribosomes may be due to the metabolic conversion of DMNA to the methylating agent CH_3^+ which appears to be the toxic and carcinogenic agent. (See also CRA 1(1):#50, 1963.)

1037 INHIBITION OF INTERFERON PRODUCTION IN HAMSTER CELLS TRANSFORMED *IN VITRO* WITH CARCINOGENIC HYDROCARBONS. (E.) Rotem, Z. (Dept. Phys., Israel Inst. Biol. Res., Ness-Ziona), Berwald and L. Sachs. *Virology* 24(3):483-486, 1964.

Newcastle disease virus was used as an interferon inducing agent and the large plaque mutant mouse encephalomyocarditis virus was used as a challenging agent in studies of the production of interferon in normal Golden Syrian hamster embryo cells (HE) and hamster embryo cells which were transformed *in vitro* by 3,4-benzpyrene (BP) or 20-methylcholanthrene (MC). As compared with the normal HE cells, a marked decrease in the production of and sensitivity to interferon occurred in the BP and MC transformed cells.

65-1038 SLOW ELIMINATION OF URETHAN IN RELATION TO ITS HIGH CARCINOGENICITY IN NEWBORN MICE. (E.) Mirvish, S. (Dept. Exp. Biol., Weizmann Inst. Sci., Rehovoth, Israel), G. Cividalli and I. Berenblum. *Proc. Soc. Exp. Biol. Med.* 116(2):265-268, 1964.

In newborn (24 hr. old) or adult (9-10 wk. old) male and female SWR mice inj. i.p. with C^{14} -urethan (U; 0.5 mg/g body wt.), the rate of elimination of U from the liver of the newborn was about 1/10th of the rate found in the adult (20% of the dose eliminated after 24 hr. in the newborn as compared to 75% after 6 hr. in the adult). In the newborn, complete elimination of U occurred after 72 hr. as compared to 8 hr. for the adult. The longer time during which U remains in the body may explain the greater carcinogenic action in newborn mice as compared with adults.

65-1039 MAMMARY TUMOR INDUCTION BY ESTROGEN OR ANTERIOR PITUITARY HORMONES IN OVARECTOMIZED RATS GIVEN 7,12-DIMETHYL-1,2-BENZANTHRACENE. (E.) Talwalker, P. K. (Dept. Physiol., Michigan State U., East Lansing), J. Meites and H. Mizuno. *Proc. Soc. Exp. Biol. Med.* 116(2):531-534, 1964.

When 7,12-dimethyl-1,2-benzanthracene (DMBA; 20 mg in 1 ml corn oil, intragastrically) was fed to intact sham-operated female Sprague-Dawley rats, 100% developed mammary tumors within 52-110 days (mean 68). Oophorectomy (oos.) 7 days before DMBA admin. completely prevented tumor induction by the end of 40 wk. However, treatment of oos. rats with 1 or 10 μ g of estradiol for 7 days before and after (total 14) DMBA admin. induced mammary tumors in 33% within 72-130 days (mean 104) and 23% within 76-102 days (mean 89) of the rats, resp. In oos. rats, combined daily treatment with growth hormone (1 mg) and prolactin (1 mg) either for 14 (2x/day) or 75 (1x/day) days increased mammary tumor incidence to 44% within 114-210 days (mean 146) or 66% within 94-207 days (mean 122), resp. All tumors were mammary carcinomas, and metastases were not seen, but often infiltration of adjacent muscles and skin was found. The results suggest that the 2 hormones as well as estrogen participate in the initiating and promoting phases of mammary carcinogenesis and the effects of the estrogen may be partially mediated through stimulation of growth hormone and prolactin secretion by the pituitary.

65-1040 PARTIAL PROTECTION BY AN OX LIVER EXTRACT AGAINST RAT LIVER CARCINOGENESIS BY 4-DIMETHYLAMINOAZOBENZENE. (E.) Fare, G. (Dept. Path., U. Birmingham Sch. Med., England). *Nature (London)* 204:1004-1005, 1964.

When ox liver extract (5 ml/rat/day) added to a diet of maize meal containing 4-dimethylaminoazobenzene (DAB; 0.09%) was given to 6 female rats for 5 days/wk., only poor protection occurred and all the rats developed tumors after 10.5 mo. as

compared with 8.5 mo. for the control animals given maize + DAB. However, it was found that the liver extract (prepared every 12 wk.) showed the presence of large numbers of yeasts. When the experiment was repeated with fresh extract, a much better degree of protection (mean tumor induction time of 14 mo.) was seen although each of the 6 rats eventually developed tumors and the protection was not so pronounced as that seen with copper acetate (see CRA 1(11):#1918, *ibid.*, (12):#2112; *ibid.*, 2(4):#695, 1964; *ibid.*, 3(1):#57, 1965). The authors noted that it would seem that the growth of the microbial contamination lowered the activity of the fraction.

65-1041 EFFECT OF CIGARETTE-SMOKE CONDENSATES ON HOMOGRAFTS OF NEONATAL LUNG TISSUE IN MICE. (E.) DiPaolo, J. A. (NCI, Bethesda). *Nature (London)* 204:1159-1161, 1964.

Slices of lungs from newborn mice of A/St and DBA/2 strains were painted with a drop of the tar material (2 whole tar (A and B) and 1 heptane fraction) to be tested (from machine smoked cigarettes) and implanted s.c. ventrally or in the thigh of 6-8-week-old hosts of same sex and strain. A total of 180 host mice received 720 grafts, of which 90 grafts (12.5%) survived. A carcinogenic effect of tar occurred in 23/90 successful grafts. Of these neoplasms, 63% were associated with the heptane fraction. Except for 4 adenocarcinomas found in the DBA/2 mice (3/4 definitely associated with mammary tissue), all the remaining tumors were found in the A/St strain. Primary tumors in the grafted area arose 8-12 wk. after implantation. The one possible bronchogenic carcinoma occurred in the lung graft which had been painted with the heptane tar fraction. Graft survival was greatest for the tar fraction A which contained the least amount of acetone. Of the 120 control grafts (painted with saline) implanted s.c., 43 (36%) survived and none developed tumors.

65-1042 EXISTENCE IN THE THYMUS OF A FACTOR PROTECTING THE SKIN OF THE MOUSE AGAINST THE INDUCTION OF SKIN CANCERS INDUCED BY 20-METHYLCHOLANTHRENE. (E.) Maisin, J. (Dept. Carcinogen., U. Louvain Cancer Inst., Belgium). *Nature (London)* 204:1211, 1964.

Three groups of L strain mice (each 30 males, 30 females) were painted with a 1/400 20-methylcholanthrene (MC) soln. in ether, 2 drops x3/wk. up to a total of 23 paintings. After this period of painting, in addition, one group was inj. every 14 days with the supernatant, and the other group with the sediment of a thymus extract from isologous neonatal mice (approx. 1 neonatal thymus per mouse every 14 days). On day 180, the number of tumors, number of survivors, and the number of animals without tumor, resp., were: in MC only controls, 32, 23, 7; in supernatant-treated group, 15, 33, 21; in sediment-treated group, 10, 21, 7. It was concluded that the neonatal thymus of the

strain L mouse contains a factor or a group of factors which protect isologous mice against MC-induced skin cancers.

65-1043 PATHOGENESIS OF THYMIC LYMPHOMA INDUCED BY URETHAN IN MICE. (E.) Ito, T. (Dept. Anat., Hokkaido U. Sch. Med., Sapporo, Japan), T. Hoshino and K. Sawauchi. *Zschr. Krebsforsch.* 66(4):267-273, 1964.

Inbred dd mice were admin. urethan (U; s.c.) at wk. intervals (wk. 1, a 5% soln., 0.1 ml; then a 10% soln., 0.1-0.3 ml, based on wt. of animals) for 6x, beginning at 10 days of age. Thymic lymphoma incidence at 135-150 days of age was 6/23 for males and 12/24 for females. In a majority of the animals, the spleen and lymph nodes were also enlarged due to leukemic involvement. Of the mice macroscopically free of tumor, 8/17 males and 6/12 females showed early neoplastic changes in the thymus. The U-induced thymic lymphoma was similar in both histological characteristics and histogenesis, to that induced by other agents.

65-1044 IMMUNOLOGICAL RESPONSE DURING CHEMICAL CARCINOGENESIS. II. ANTIBODIES AGAINST NUCLEIC ACID AND NUCLEOPROTEIN. (E.) Lin, F.-J. (Dept. Biochem., Nat. Taiwan U. Coll. Med., Taipei) and T.-C. Tung. *J. Formosa. Med. Assn.* 62(9):669-671, 1963.

In the sera of rats fed 4-dimethylaminoazobenzene for up to 30 wk., no antibodies against nucleoprotein or nucleic acid were detected by the complement fixation test. It is suggested that chemical carcinogenesis does not involve an immunological mechanism.

65-1045 COMPARATIVE STUDIES IN THE INDUCTION OF MAMMARY TUMORS IN WISTAR AND SPRAGUE-DAWLEY RATS BY ORAL ADMINISTRATION OF 7,12-DIMETHYL-1,2-BENZANTHRACENE. (Ger.) Engelbart, K. (Hoechst AG, Frankfurt am Main, Germany) and D. Gericke. *Zschr. Krebsforsch.* 66(4):316-320, 1964.

Following treatment with 9,10-dimethyl-1,2-benzanthracene (DMBA; 20 mg x1 in sesame oil, p.o.), 19/26 (73%) female Sprague-Dawley rats (SDR) developed 52 mammary tumors (MT) within 20 wk. The first tumors appeared after 9 wk., and were histologically mostly adenocarcinomas. Female Wistar rats (WR) showed no tumors after similar treatment. Following DMBA (10 mg x3 every 14 days p.o.), 49/49 SDR and 33/49 (67%) of WR developed 219 and 55 MT, resp., within 14 wk. The first tumors were noted after 8 wk., and histologically were mostly adenocarcinomas. DMBA, 15 mg x 3, p.o., was fatal to all SDR within 10 days after the last dose. When compared with methylcholanthrene, DMBA was effective at a lower conc., had a shorter latent period and induced MT in 100% of the rats.

5-1046 MORPHOLOGICAL STUDIES ON THE EFFECT OF N-NITROSOMORPHOLINE ON THE MOUSE LUNG. (Ger.) Müller, H.-A. (Inst. Path., U. Würzburg, Germany). Zschr. Krebsforsch. 66(4):303-309, 1964.

Male, NMRI-mice (58; wt. 26 g) treated with N-nitrosomorpholine (NNM; 16 mg/kg/day) frequently developed non-metastasizing pulmonary tumors, which were histologically benign, as well as malignant adenomas, bronchial papillomas and a single cornified squamous epithelial carcinoma, the origin of which is not clear. The morphological changes of the bronchial mucosa are described in detail. (See also CRA 3(1):#103, 1965.)

5-1047 AN EXPERIMENTAL STUDY OF CHLOROMA. EXPERIMENTAL TRANSPLANTATION. (Jap., Abstract) Ando, M. (Dept. Intern. Med., Showa Coll. Med., Japan), T. Ueno, S. Uto, Y. Sugada, Y. Yada, J. Shimizu, K. Tashiro and Y. Yabuki. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):61, 1964.

The authors reported that admin. of methylcholanthrene to "Shian" Wistar rats failed to induce chloroma. Subcutaneous administration of homogenates of the tumor tissue, liver, spleen, or blood of methylcholanthrene-induced-chloroma-bearing rats (obtained from Dr. Shay) to newborn rats (no details) induced tumor formation after approx. 15-17 days accompanied by the appearance of immature cells in the blood.

5-1048 EXPERIMENTALLY INDUCED CHANGES OF THE ORGAN-SPECIFIC NUCLEAR STRUCTURES IN THE MOUSE LIVER. (Ger.) Müller, H.-A. (Inst. Path., U. Würzburg, Germany). Verh. Deutsch. Ges. Path. 48:200-203, 1964.

See CRA 3(1):#103, 1965.

5-1049 CONCERNING THE DISTRIBUTION OF MITOSES IN REGENERATING RAT LIVER. (E.) Cunningham, M. G. (Dept. Path., U. Melbourne, Australia) and P. E. Hughes. Exp. Cell Res. 6(3):592-604, 1964.

After 2 wk. of feeding of male Wistar rats on a basal diet plus 0.2 ml/100 g of a 50% soln. of ^{14}C in liquid paraffin p.o. every 4 days or + 0.06% of 2-methyl-4-dimethylaminoazobenzene or + 0.06% 3'-methyl-4-dimethylaminoazobenzene, partial hepatectomies were performed (only between the hr. of 10 A.M and 12 noon). After the operation the rats returned to the same diet for 48 hr. and were then sacrificed. When livers of these and various control rats were examined for mitoses, most showed a non-random distribution irrespective of age, diet or laboratory of origin. This pattern, such as would be expected for clonal selection, fitted best a Neyman Type A distribution.

65-1050 THE PREVENTION BY INJECTIONS OF CORTICOTROPIN OF A HEMOCHROMATOSIS INDUCED IN THE RAT BY THE ADMINISTRATION OF o-p'-DICHLORODIPHENYLDICHLOROETHANE AND BUTTER YELLOW. (Fr.) Lacassagne, A. (Radium Inst., Paris) and L. Hurst. C. R. Acad. Sci. (Paris) 259(23)(Group. 14): 4415-4417, 1964.

In adult male Wistar rats fed a diet containing 0.6 g of p-dimethylaminoazobenzene (DAB) and 0.6 g of o-p'-dichlorodiphenyldichloroethane (o-p'-DDD) per kg and observed for a period of 293-332 days, the simultaneous admin. of ACTH (depot preparation; 2 U/wk. s.c.) increased the inhibitory effect of o-p'-DDD on liver DAB-carcinogenesis. ACTH also completely prevented the appearance of hemochromatosis (Kupffer cell hyperplasia, iron pigment accumulation, erythroblastic reaction) in animals fed DAB and o-p'-DDD alone. (See also the following abstract.)

65-1051 COMPLETE INHIBITION BY p-HYDROXYACETOPHENONE OF RAT LIVER CARCINOGENESIS BY BUTTER YELLOW. (Fr.) Lacassagne, A., N. P. Buu-Hoi, L. Hurst and N. B. Giao. C. R. Acad. Sci. (Paris) 258(23)(Group. 14):5763-5766, 1964.

In 18 adult male Wistar rats (wt. 400 g) admin. a diet with 0.06% p-dimethylaminoazobenzene (DAB), the addition to the diet of p-hydroxyacetophenone (PHA; 15 g/kg; 10/18) or p-hydroxybutyrophenone (PHB; 15 g/kg; 8/18) completely inhibited liver carcinogenesis over a period of 314-465 days. Both PHA and PHB caused a significant fatty accumulation and atrophy of the adrenals and testicles with marked interference with spermatogenesis. With PHB, the testicular atrophy was more rapid and marked and no spermatogenesis was seen. (See also CRA 1(11):#1898 and #1899, 1964; *ibid.*, 3(3): #433, 1965, and the preceding abstract.)

65-1052 STUDIES ON THE MECHANISM OF AZO DYE CARCINOGENESIS: ON THE FORMATION OF PROTEIN-BOUND DYE BY DAB-N-OXIDE *IN VIVO*. (Jap.) Orii, H. (Dept. Radiol., U. Tokyo Sch. Med., Japan). Tokyo Igaku Zasshi (Tokyo J. Med. Sci.) 71(6):199-211, 1963.

A metabolite of 4-dimethylaminoazobenzene (DAB) found in rat liver during carcinogenesis is DAB-N-oxide (DAB-N-O). When 65 mg of DAB-N-O were incub. with 20% rat muscle homogenate at 37°C for 30 min., 10 µg of dye combined with protein. Protein-bound azo dye was also formed in rat leg muscle after i.m. inj. of DAB-N-O. Protein-bound azo dye was also formed by DAB-N-O in the leg muscle and livers of guinea pigs which were resistant to DAB carcinogenesis. Among 13/16 surviving male Wistar rats fed DAB-N-O in the drinking water (0.03%), 11 developed hepatoma between mo. 6-12 and 2 showed adenomatous hyperplasia.

65-1053 CHARACTERISTICS IN THE METABOLIC CHANGES OF THE LIVER OF RATS IN THE EARLY STAGES

OF 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE ADMINISTRATION. I. INFLUENCES OF THE DOSAGE OF THE DYE AND THE ROUTE OF ADMINISTRATION UPON THE CHANGES OF THE LIVER. (Jap.) Hirota, T. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(2):134-141, 1963.

Male Wistar rats received a single i.p. inj. of a large dose (LD) of 3'-methyl-4-dimethylaminoazobenzene (MeDAB; 20 mg, 1 ml of 2% MeDAB in olive oil); this dose was fatal to 70% after 3-5 days. Some received by gastric intubation a small dose (SD) of MeDAB (9.6 mg, 0.24 ml of 2% MeDAB in olive oil, 2x/day). Biochemical changes in the livers of both groups of rats were determined 3-14 days after treatment and compared with those changes in normal liver. There was a 30%-35% decrease in RNA despite increased DNA in LD and unchanged DNA in SD. There was a 2-3-fold increase in anaerobic glycolysis, a decrease in endogenous respiration (in LD only), and also for LD a decrease in α -ketoglutarate oxidation both as regards activity and DPN-activation of endogenous respiration. In both groups no changes were noted in cytochrome oxidase, succinic oxidase and in oxidative phosphorylation which accompanied succinate and α -ketoglutarate oxidation. (See also the following abstract.)

65-1054 CHARACTERISTICS IN THE METABOLIC CHANGES OF THE LIVER OF RATS IN THE EARLY STAGES OF 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE ADMINISTRATION. II. CHANGES IN SUBCELLULAR PARTICLES OF RAT LIVER INDUCED BY 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE FEEDING. (Jap.) Hirota, T. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(2):142-149, 1963.

The liver tissues which were obtained from male Wistar rats fed 3'-methyl-4-dimethylaminoazobenzene (9.6 mg/day) for 15 and 30 days were subjected to fractionation. After 30 days of dye feeding, the DNA content was increased to various degrees, and this was reflected by histological changes such as degeneration of liver cells in some rats and the proliferation of smaller sized cells in bile ductules and connective tissues in others. After 15-30 days of dye feeding, RNA and nitrogen content were decreased in mitochondria, microsome and supernatant fractions but were unaltered in the nucleus. Succinic oxidase and α -ketoglutarate oxidation in homogenates and supernatants were decreased. Activities of glutamic-pyruvic-transaminase (which was localized in the supernatant fraction), and cytochrome c reductase (which was distributed in the supernatant and microsomal fractions) were markedly decreased. It is suggested that the metabolic changes in the microsome and cell sap fractions may be responsible for the cytomorphological changes in the endoplasmic reticulum which follow feeding of the dye. (See also the preceding abstract.)

65-1055 LEUKEMOGENESIS BY CHEMICAL CARCINOGEN, WITH SPECIAL REFERENCE TO THE ROLE OF VIRUS IN ITS INDUCTION OF LEUKEMIA. (Jap.) Irino, S. (Okayama U. Sch. Med., Japan). Nishin Igaku (Jap. J. Med. Progr.) 50(2):74-84, 1963.

See CRA 1(8):#1467 and #1468, 1963; *ibid.*, (9-10):#1702, #1732 and #1758; *ibid.*, (12):#2153; and *ibid.*, 2(2):#249, 1964.

65-1056 LEUKEMOGENESIS BY CHEMICAL CARCINOGENS. (Jap.) Hiraki, K. (Okayama U. Sch. Med., Japan), S. Irino, Z. Ota, T. Asano, K. Shinagawa, T. Sezaki and I. Miyoshi. Sogo Rinsho (Clin. All-Round) 12(9):1757-1765, 1963.

See CRA 1(4):#670; *ibid.*, (8):#1467 and #1468, 1963; and *ibid.*, 1(9-10):#1702, #1732 and #1758, 1964.

65-1057 BENZENE AND LEUKEMIA. (E.) Vigliani, E. C. (Dept. Indust. Med., U. Milan, Italy) and G. Saita. New Eng. J. Med. 271(17):872-876, 1964.

In addition to the cases reported in CRA 1(1):#95, 1963, eleven additional cases of benzene hemopathy are mentioned (bringing the total to 47 cases observed between 1942 and 1963). The 6 cases of hemocytoblastic leukemia are described in detail (2 were published previously). Among the other 41 pts., 2 showed anemia, 7 anemia + leukopenia, 5 anemia + thrombocytopenia, 26 pancytopenia, and 1 leukemoid reaction. During 1960-1963, there were 12 cases of leukemia and 56 of aplastic anemia (number of deaths: 11 and 15, resp.) related to chronic benzene poisoning in the Provinces of Milan and Pavia. This represents a high incidence of leukemia when it is considered that the population at risk is estimated at 3,000-5,000 workers.

65-1058 INDUCTION OF MAMMARY AND OVARIAN TUMORS IN THE GOLDEN HAMSTER TREATED WITH URETHAN. (Fr.) Rivière, M.-R. (Dept. Exp. Med., Inst. Sci. Res. Cancer, Villejuif/Seine, France), M. T. Perrier and M. Guérin. C. R. Acad. Sci. (Paris) 258(12)(Group. 14):3395-3397, 1964.

In addition to results previously described in CRA 3(1):#72, 1965, the authors report that all the hamsters which developed mammary tumors following treatment by means of cutaneous paintings or feeding with urethan were also found to have unilateral or bilateral ovarian tumors (folliculomas or luteomas), pulmonary adenomas and melanotic tumors.

65-1059 HEPATOMA IN MOUSE INDUCED BY BUTTER YELLOW. (Jap., Abstract) Akagi, T. Kurume Igakkai Zasshi (J. Kurume Med. Assn.) 27(4):313, 1964.

All mice fed 0.04% 4-dimethylaminoazobenzene (DAB; in olive oil), in a basal diet of equal volumes of rice, millet and corn, developed hepatoma 5 mo. after start of feeding. However, when the diet consisted of corn plus 0.04% DAB, no hepatoma developed even after 6 mo.

65-1060 EXPERIMENTAL STUDY OF THE EFFECT OF ANTI-CANCER RABBIT SERUM ON CARCINOMA OF THE CHOLEDOCHUS OF THE RAT. (Jap.) Mizuno, D. (Dept. Path., Osaka Coll. Med., Japan). Osaka Ika Igaku Zasshi (J. Osaka Med. Coll.) 22(3):71-88, 1963.

4-Aminoazotoluene (00AT; 7 mg/day p.o.) was given to 92 Wistar rats (chiefly males, approx. 20-150 g). Cancer of the choledochus was induced in some rats more than 250 days after initial treatment (in one rat at 154 days). Anti-cancer rabbit serum (ACRS) was obtained from normal rabbits given multiple inj. of the liver tissue of tumor-bearing rats. When ACRS was inj. i.v. or intraperitoneally into rats bearing the 00AT-induced carcinoma of the choledochus, 6-48 hr. after inj. various histologic changes were seen: generalized edema of tumor tissue, degeneration of tumor cells and disappearance of tumor cells. These changes were not seen in tumor-bearing rats which did not receive inj. of ACRS.

65-1061 STUDIES OF CORRELATIONS BETWEEN BLOOD CORPUSCLES AND SERUM. V. ALTERATIONS OF PHOSPHORIC ACID SUBSTANCES DURING THE DAB-INDUCED CARCINOGENIC PROCESS. (Jap., Abstract) Matsunaga, F. (Dept. Intern. Med., Hirosaki U. Sch. Med., Japan), T. Yamaguchi, T. Suzuki, M. Shimoyama, K. Suzuki, M. Hanada, K. Mikawa, J. Ishiwata and H. Kikuchi. Nippon Naika Gakkai Zasshi (Jap. J. Intern. Med.) 53(6):717-718, 1964.

Various enzymes in the liver were studied during different phases of 4-dimethylaminoazobenzene carcinogenesis in rats on a vitamin B₂-deficient diet. Three liver fractions were studied: nuclear, mitochondrial, and microsome-superatant. Measurement of ATP-ase, β -glycerophosphatase (both at pH 9.2 and pH 5.2), G6P-ase, Nase, and RNase (both at pH 4.5 and pH 8.2) in the 3 fractions during the degenerative, cirrhotic, regenerative, and transitional (to adenocarcinoma) phases indicated that DAB is bound with intracellular lipoprotein, especially in the microsomes. Similar patterns were also observed in AH130 scites hepatoma cells. Infrared spectrophotometry of nucleic acids, nucleic proteins and phospholipids (obtained from the same liver tissue) demonstrated certain changes in the DNA, RNA, RNP, and phospholipids characteristic of carcinoma. The authors concluded that during the regenerative phase, the combination of DAB and lipoprotein causes abnormality in the combining pattern as well as in the "surface vibratory energy" of the lipoprotein itself and phospholipids, which, during the cirrhotic phase, affect both the ribosomes and RNA. Thus proteins

and enzymes produced in the subsequent phases are bound to carry this abnormality. The binding of these proteins with abnormal phospholipids also results in the production of lipoprotein. The combination of partially abnormal nucleohistone and DNA is suspected of causing an abnormality in the combining pattern as well as in the "surface vibratory energy" of DNP. The authors stated that it is possible that this DNP abnormality will be transmitted to RNA without the loss of species-specificity of DNA. The DNP is then responsible for production of cytoplasm which lacks organ specificity.

65-1062 CYTOCHEMICAL STUDIES ON TUMOR CELLS. VI. CHANGES IN LIPID AND HORMONE IN THE LIVER AND ADRENAL OF RATS FED AZO DYES. (E.) Hori, S. H. (Inst. Zool., Hokkaido U. Sch. Sci., Japan) and T. Matsuzawa. Gann 55(4):305-314, 1964.

Adult male Wistar-King-A or Buffalo rats were fed ad lib 3'-methyl-4-dimethylaminoazobenzene (0.06%) in the diet for 2-6 mo. and in some instances for longer periods. After 2-5 mo. of feeding, no detectable change in the reactivity of the adrenal medulla to the chromaffin and iodate reactions was seen, while the sudanophilia of the zona fasciculata was moderately reduced in some animals. In the liver after 6-7 mo. of feeding, neoplasms developed (trabecular hepatoma) in some of the rats, but no direct correlation was found between its development and the adrenal function. All of the rats killed after 8 mo. or more of azo feeding had liver tumors (trabecular hepatoma or adenohepatoma) which were negative or slightly positive to the acid hematein test (for phospholipids), but the results obtained in the adrenals were not as clear and no definite relationship was found between carcinogenic changes in the liver and histochemical changes in the adrenal.

65-1063 THE PARTICIPATION OF HERPES SIMPLEX VIRUS IN METHYLCHOLANTHRENE-INDUCED CARCINOGENESIS. (Jap.) Tanaka, A. (Dept. Surg., Okayama U. Sch. Med., Japan). Sogo Rinsho (Clin. All-Round) 13(10):1895-1898, 1964.

Female Swiss mice (28-30 g) receiving both 20-methylcholanthrene (MC; daily topical application of 0.2 ml in 1% benzene) and brain tissue homogenate containing herpes simplex virus (Herpes HF; single intracutaneous dose on day 4 following MC) showed after 8 wk. a higher av. incidence of tumor (papilloma) formation than did mice receiving MC alone (63% as compared to 34%). The incidence of tumor formation among mice receiving MC + brain tissue homogenate without Herpes HF was 30%. Admin. of Herpes HF on day 14 of MC treatment, or 7 days before the start of MC treatment, was less effective in increasing tumor incidence (45% and 39%, resp.). Diluted Herpes HF-containing homogenate (10 x) or preheated homogenate (56°C for 30 min.) + MC decreased the av. tumor incidence to 37%. Results indicate that the virus was responsible for the increased incidence of tumor formation.

- 65-1064 INFLUENCE OF STEROID TREATMENT ON EXPERIMENTAL TUMORIGENESIS IN THE OVARY. (Sp.) Uranga Imaz, F. A. (Dept. Obstet., U. Buenos Aires, Argentina). Obstet. Gynec. Lat. Am. 22(5-6):266-274, 1964.

In 45 male and female young rats (120-150 g wt.) gonadectomy was followed by the transplantation of one ovary into the spleen. Treatment begun on the day following surgery and consisting of androstanolone (AS; 1 mg 2-3x/wk. for 46-60 days, total 15-25 mg, s.c.) or allylestrenol (AE; 10 mg 3x/wk., total 210 mg by gastric intubation) or acetoxypregesterone (AP; 5 mg/day x 53-58, total 60-130 mg, s.c.) did not prevent the formation of tumors in the transplanted ovaries which developed in 3/10, 5/10 or 7/11, animals, resp. When the admin. of AS (1 mg 3x/wk., total 19-38 mg) was begun 6-8 mo. after implantation, the already established ovarian tumors regressed in 3/9; AE produced no regressions. The author concludes that AE and AP show complete lack of activity on the pituitary, while AS exerts a certain degree of pituitary inhibition.

- 65-1065 INFLUENCE OF STEROID TREATMENT ON EXPERIMENTAL TUMORIGENESIS IN THE OVARY. (Sp.) Uranga Imaz, F. A. Rev. Soc. Obstet. Gynec. B. Aires 42(594-595):391-396, 1963.

See the preceding abstract.

- 65-1066 SYNTHESIS OF A SULFUR ISOSTERE OF CHOLANTHRENE. (Fr.) Faller, P. (Hydrocarbon. Lab., U. Strasbourg, France). C. R. Acad. Sci. 258(10):2839-2841, 1964.

The synthesis of acenaphthene-7,8-b-benzo-d-thiophene is described. No biological data are reported.

- 65-1067 ATYPICAL PROLIFERATION OF UTERINE CERVICAL EPITHELIUM IN GUINEA PIGS CAUSED BY CONTINUOUS ADMINISTRATION OF GONADOTROPIC HORMONES. (Jap., Abstract) Hayashi, Y. (Dept. Obstet. Gynec., Hokkaido U. Sch. Med., Japan), H. Kikukawa, T. Kanemoto and M. Ueno. Nippon Naibunpi Gakkai Zasshi (Folia Endocr. Jap.) 40(6):487, 1964.

A study (>2 yr.) of the histopathological effects of estrogens and gonadotropins on the uterus of guinea pigs revealed that the continuous admin. of gonadotropic hormones induced pronounced atypical proliferation of uterine cervical epithelium (a precancerous condition), atrophy of the ovaries and hypertrophy of the zonae fasciculata and reticularis of the adrenal cortex. Admin. of large or small doses of estrogen, with or without progesterone or thymus extract, resulted in no change or only a slight change in the cervical epithelium.

- 65-1068 BLADDER TUMOR AND β -GLUCURONIDASE. GROWTH-INHIBITORY EFFECT OF SACCHARO-1,4-LACTONE ON β -NAPHTHYLAMINE-INDUCED EXPERIMENTAL BLADDER TUMOR. (Jap., Abstract) Nin, N. (Chiba U., Japan). Nippon Hinyokika Gakkai Zasshi (Jap. J. Urol.) 55(8):764, 1964.

A papillomatous proliferation was induced by β -naphthylamine (N) in the bladder in 9/10 rats after s.c. admin. and in 3/10 rats after p.o. admin. There was no increase in urinary β -glucuronidase. The concurrent admin. of both N (s.c.) and saccharo-1,4-lactone (S) gave rise to no tumors in the bladder, whereas the concurrent admin. of N (s.c.) and testosterone (Enarmon) induced the formation of a papillary protrusion in the bladder mucosa in 8/10 rats, indicating the tumor-inhibitory action of S and the tumor accelerating action of the male hormone.

- 65-1069 CARCINOGENIC EFFECTS OF DIETS CONTAINING CONTAMINATED PEANUTS. (Fr.) Richir, C. (U. Dakar Sch. Med., Senegal), M. Martineaud, J. Toury and H. Dupin. C. R. Soc. Biol. (Paris) 158(6):1375-1379, 1964.

Male and female rats (strain WAG; av. wt. 168 g) were fed diets with 20-80% naturally contaminated peanuts (P) in which the aflatoxin B₁ (AF) content was 1 mg/kg. Over a period of 200-days, hepatomas were found in 3/54 rats: 2/3 in animals on a 20% P-diet (after a total amount of 2.35 and 1.31 mg of AF, resp.); 1/3 in a rat fed 80% P (total of 2.14 mg of AF). The liver of P-fed rats presented severe cellular (anisocytosis and anisokaryosis) and lobular lesions; 60% of the rats presented nodules of atypical segregated cells which were considered precancerous and manifested after day 98 following doses of 0.87 mg/animal of AF. All rats were found to have, in addition, bronchial epidermoid metaplasia and testicular atrophy with interstitial edema and azoospermia.

- 65-1070 OBSERVATIONS ON FUNGAL INTOXICATION IN DUCKLINGS. (Fr.) Richir, C. (U. Dakar Sch. Med., Senegal), J. Toury, M. Martineaud and H. Dupin. Nutr. Dieta (Basel) 6(3):229-233, 1964.

In a duck-breeding station in Senegal the whole stock was rapidly wiped out 4 times over 8 mo. by liver intoxication from feed contaminated with Aspergillus flavus. The estimated aflatoxin content was 2-5 mg/kg. (See also CRA 3(3):#586, 1965.)

- 65-1071 METHYLCHOLANTHRENE-INDUCED CHANGES IN RAT LIVER NUCLEAR RNA. (E.) Loeb, L. A. (NCI, Bethesda) and H. V. Gelboin. Proc. Nat. Acad. Sci. USA 52(5):1219-1226, 1964.

In Sprague-Dawley male rats (35-45 g) inj. i.p. with methylcholanthrene (MC; 1 mg) at various times during fasting, the uptake of orotic acid-C¹⁴

into nuclear RNA increased, suggesting enhanced RNA synthesis; there was a 15-50% increase in the RNA content of isolated nuclei as shown by increased RNA to DNA ratio. RNA isolated from the liver cell nuclei of MC-treated rats had greater stimulatory activity in an *E. coli* phenylalanine-incorporating system, suggesting a greater messenger RNA content. With respect to the latter, actinomycin D (6 µg) did not significantly affect the stimulatory activity of nuclear RNA from normal and MC-treated rats. Overall, similar results were obtained in studies with adrenalectomized animals. (See also CRA 1(5):#877, 1963.)

65-1072 STUDIES ON THE MECHANISM OF METHYLCHOLANTHRENE INDUCTION OF ENZYME ACTIVITIES OF RAT LIVER. I. AMINO ACID INCORPORATION IN RAT-LIVER HOMOGENATES. (E.) Elboin, H. V. (NCI, Bethesda) and L. Sokoloff. *Biochim. Biophys. Acta* 91(1):122-129, 1964.

See CRA 1(7):#1295, 1963. (See also CRA 1(5):#877, 1963 and the preceding abstract.)

65-1073 STUDIES ON THE MECHANISM OF METHYLCHOLANTHRENE INDUCTION OF ENZYME ACTIVITIES. II. STIMULATION OF MICROSOMAL AND CYTOSOLIC AMINO ACID INCORPORATION: THE EFFECTS OF POLYURIDYLIC ACID AND ACTINOMYCIN-D. (E.) Elboin, H. V. (NCI, Bethesda). *Biochim. Biophys. Acta* 91(1):130-144, 1964.

See CRA 1(5):#877, 1963; and *ibid.*, (11):#1897, 1964. (See also CRA 1(7):#1295, 1963; and *ibid.*, (8):#1463, 1964.)

65-1074 INDUCTION OF EXPERIMENTAL TUMORS BY 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE-N-OXIDE AND CULTIVATION OF THE TUMORS. (Jap., Abstract) Okajima, E. (*Nara Igaku Zasshi* J. *Nara Med. Assn.*) 15(4):316-318, 1964.

This is a summation of the papers abstracted as CRA 3(2):#251 and #252, 1965.

65-1075 THE ULTRASTRUCTURE OF EXPERIMENTAL CANCER OF THE ENDOMETRIUM. (E., Abstract) Baba, N. (Dept. Path., Ohio State U., Columbus). *Lab. Invest.* 13(8):938-939, 1964.

Carcinogens employed on various rodents were 20-methylcholanthrene and diethylstilbestrol.

65-1076 HISTOGENESIS OF STILBENE-INDUCED EAR DUCT TUMOURS IN THE RAT. (E., Abstract) Harteis, S. J. *Roy. Coll. Surg. Eng.* 1964:57

65-1077 BREAST CANCER AND CYTOLOGIC DYSPLASIA IN MANY ORGANS AFTER THERAPY WITH

BUSULFAN (MYLERAN). (E., Abstract) Nelson, B. M. and G. A. Andrews. P. 7 in *Oak Ridge Inst. Nucl. Studies*. (ORINS). Med. Div. Rept. 1963. Contract #AT-40-1-GEN-33 U.S. Atomic Energy Comm. Office Tech. Serv. Dept. Commerce, Washington, D. C. (Publ.), 1963, 105 pp.

A case report.

65-1078 ELECTRON MICROSCOPIC STUDY OF EXPERIMENTALLY INDUCED POLYPS AND CARCINOMAS OF THE COLON IN RATS. (E., Abstract) Spjut, H. J. and M. N. Smith. *Am. J. Clin. Path.* 42(5):518, 1964.

The carcinogen employed was 3,2'-dimethyl-4-aminodiphenyl.

65-1079 MALIGNANT MYELOSIS DUE TO BENZENE AND OSTEOPATHY. (Sp.) Bellón Renovales, L. (Nat. Inst. Med., Madrid, Spain), A. Parada Barros and J. Cerra Gonzalez. *Excerpta Med. (Int. Congr. Ser. #62)* 2:898-901, 1964.

Described is the case of a 64-year-old man who developed a malignant myelosis with bone lesions similar to those of Kahler's disease after exposure to benzene for 13 yr.

65-1080 REACTIONS OF ³H-LABELLED BUTTER YELLOW IN VIVO AND N-HYDROXYMETHYLAMINOAZO-BENZENE IN VITRO. (E., Abstract) Roberts, J. J. (Chester Beatty Res. Inst., London, S.W. 3) and G. P. Warwick. *Biochem. J.* 93(3):18p, 1964.

65-1081 THE EFFECT OF LUTEOSKYRIN, A TOXIC SUBSTANCE DERIVED FROM *PENICILLIUM ISLANDICUM* SOPP, ON MITOCHONDRIAL SWELLING. (Fr.) Uéno, Y. (Dept. Pharm., U. Tokyo Sch. Med., Japan), I. Uéno, T. Tatsuno and K. Uruguchi. *Jap. J. Exp. Med.* 34(4):197-209, 1964.

Effects of the mycotoxin on the swelling and contraction of rat liver mitochondria are reported.

65-1082 DETERMINATION OF CARCINOGENIC HYDROCARBONS IN THE ATMOSPHERE. (Rum.) Zvinčá-Selegean, E. *Igiena (Bucur.)* 12:353-362, 1963.

Technics are described for the determination of hydrocarbons in natural (unburned) coal, asphalt and soot.

65-1083 AN EFFECT OF POLYCYCLIC HYDROCARBONS ON BACTERIOPHAGE REPLICATION. (E., Abstract) Hsu, W.-T. (Argonne Cancer Res. Hosp., Ill.), J. W. Moohr and S. B. Weiss. *Fed. Proc.* 24(2)(Pt. 1):287, 1965.

- 65-1084 JOINT ONCOGENIC ACTION OF HERPESVIRUS OR ANTIMETABOLITES WITH METHYLCHOL-ANTHRENE IN MICE. (E., Abstract) Arata, T. (Sloan-Kettering Inst., New York, N. Y.) and C. Southam. Fed. Proc. 24(2)(Pt. 1):308, 1965.
- 65-1085 THE INFLUENCE OF THYROID HORMONE AND TESTOSTERONE ON THE INDUCTION OF CARCINOMA AND CIRRHOSIS OF THE LIVER IN FEMALE WISTAR RATS INGESTING N-2-FLUORENYLDIACETAMIDE. (E., Abstract) Reuber, M. D. (NIH, Bethesda). Fed. Proc. 24(2)(Pt. 1):431, 1965.
- 65-1086 EFFECT OF p-HYDROXYPROPIOPHENONE (PHP) ON HEPATOTOXICITY OF CHRONIC POISONING WITH CARBON TETRACHLORIDE (CCl₄) IN MICE. (E., Abstract) Unakar, N. J. (Dept. Biol., Brown U., Providence, R. I.). Fed. Proc. 24(2)(Pt. 1):430, 1965.
- 65-1087 INDUCTION, GROWTH, AND HISTOGENESIS OF GLANDULAR MICROTUMORS IN THE GUINEA PIG STOMACH. (E., Abstract) Zaldívar, R. S. d. (U. Chile, Santiago). Fed. Proc. 24(2)(Pt. 1):436, 1965.
- 65-1088 EFFECT OF CIRRHOSIS AND AFLATOXIN ON LIVER TUMOR INDUCTION. (E., Abstract) Newberne, P. M. (Dept. Nutrition, Massachusetts Inst. Tech., Cambridge) and G. N. Wogan. Fed. Proc. 24(2)(Pt. 1):431, 1965.
- 65-1089 EFFECT OF 7,12-DIMETHYLBENZANTHRACENE (DMBA) INDUCED MAMMARY CARCINOGENESIS ON IN VIVO OXIDATION OF GLUCOSE-C¹⁴. (E., Abstract) Ho, G. B. (U. Chicago, Ill.) and G. T. Okita. Fed. Proc. 24(2)(Pt. 1):455, 1965.
- 65-1090 OBSERVATIONS ON A TRANSPLANTABLE LEUKEMIA IN THE MONGOLIAN GERBIL. (E., Abstract) Magalini, S. I. (Child. Cancer Res. Found., Boston, Mass.), A. H. Handler and G. P. Mascioli. Fed. Proc. 24(2)(Pt. 1):437, 1965.
- 65-1091 RESPONSE OF REGENERATING PRECANCEROUS LIVERS TO MITOTIC INHIBITION BY SERUM FROM ADULT RATS. (E., Abstract) Jackson, B. (Lederle Lab., Pearl River, N. Y.). Fed. Proc. 24(2)(Pt. 1):436, 1965.
- 65-1092 INDUCTION OF INCREASED BENZOPYRENE DETOXIFICATION IN THE LUNG. (E., Abstract) Wattenberg, L. W. (U. Minnesota Sch. Med., Minneapolis) and J. L. Leong. Fed. Proc. 24(2)(Pt. 1):494, 1965.
- 65-1093 THE RESPONSE OF THE RAT LIVER TO IMPLANTED CARCINOGENS. (E., Abstract) Alterman, K. (Child. Hosp., Buffalo, N. Y.). Fed. Proc. 24(2)(Pt. 1):685, 1965.
- Carcinogens employed were methylcholanthrene and butter yellow; rats were inj. repeatedly with CCl₄.
- 65-1094 CARCINOGENESIS IN RATS DUE TO DIETARY 2AAF AND LEAD SUBACETATE. (E., Abstract) Shakerin, M. (Presbyt.-St. Luke's Hosp., Chicago, Ill.), J. Paloucek, R. Oyasu and G. M. Hass. Fed. Proc. 24(2)(Pt. 1):684, 1965.
- 65-1095 CARCINOGENIC EFFECT OF CHOLESTEROL IN MICE. (E., Abstract) Szepeswol, J. (U. Puerto Rico Sch. Med., Rio Piedras). Fed. Proc. 24(2)(Pt. 1):685, 1965.
- 65-1096 UPTAKE OF POLYCYCLIC COMPOUNDS BY A PHAGOTROPIC PROTOZOAN. (E., Abstract) Small, M. (Child. Cancer Res. Found., Boston, Mass.), E. Brickman and S. S. Epstein. Fed. Proc. 24(2)(Pt. 1):684, 1965.
- 65-1097 TUMOR SPECIFIC ANTIGENICITY OF METHYLCHOLANTHRENE (MCA) AND DIBENZANTHRACENE (DBA) INDUCED SARCOMAS OF INBRED GUINEA PIGS. (E., Abstract) Morton, D. L. (U. California Med. Ctr., San Francisco), L. Goldman and D. Wood. Fed. Proc. 24(2)(Pt. 1):684, 1965.
- 65-1098 FACTORS COMPLICATING THE EVALUATION OF THE CARCINOGENICITY OF FUNGAL CONTAMINANTS IN PEANUT MEALS FED TO DUCKLINGS. (E., Abstract) Prickett, C. O. (Agric. Exp. Sta., Auburn U., Ala.) and W. D. Salmon. Fed. Proc. 24(2)(Pt. 1):627, 1965.
- 65-1099 CRYSTALLINE AFLATOXINS CAUSE TROUT HEPATOMA. (E., Abstract) Ashley, L. M. (West. Fish Nutr. Lab., USFWS, Cook, Wash.), J. E. Halver, W. K. Gardner, Jr. and G. N. Wogan. Fed. Proc. 24(2)(Pt. 1):627, 1965.
- 65-1100 AFLATOXINS IN COTTONSEED MEAL AND HEPATOMA IN RAINBOW TROUT. (E., Abstract) Sinnhuber, R. O. (Dept. Food Sci., Oregon State U., Corvallis), J. H. Wales, R. H. Engebrecht, D. F. Amend, W. D. Kray, J. L. Ayres and W. E. Ashton. Fed. Proc. 24(2)(Pt. 1):627, 1965.
- 65-1101 DISTRIBUTION AND EXCRETION OF C¹⁴ LABELED AFLATOXIN B₁ IN THE RAT. (E., Abstract) Shank, R. C. (Dept. Nutrit., Massachusetts Inst. Tech., Cambridge) and G. N. Wogan. Fed. Proc. 24(2)(Pt. 1):627, 1965.
- 65-1102 MECHANISM FOR INCREASED ADENYLIC ACID DEAMINASE ACTIVITY DURING AZO-DYE HEPATOCARCINOGENESIS. (E., Abstract) Kizer, D. E.

Samuel Roberts Noble Found., Inc., Ardmore, Okla.), B. A. Howell, J. A. Clouse and B. Cox. Proc. Am. Assn. Cancer Res. 6:36, 1965.

5-1103 EOSINOPHILIC CYTOPLASMIC INCLUSIONS IN MOUSE HEPATOMAS. (E., Abstract) Liebelt, A. G. (Baylor U. Coll. Med., Houston, Tex.), R. A. Liebelt, T. Rogers, J. A. Sykes and J. Dmochowski. Proc. Am. Assn. Cancer Res. 6:40, 1965.

5-1104 INCREASED N-HYDROXYLATION OF 2-ACETYLAMINOFLUORENE (AAF) ON PRETREATMENT OF RATS OR HAMSTERS WITH 3-METHYLCHOLANTHRENE (MC). (E., Abstract) Lotlikar, P. D. (McArdle Lab., U. Wisconsin, Madison), M. Enomoto, E. C. Miller, J. A. Miller and H. P. Newton. Proc. Am. Assn. Cancer Res. 6:41, 1965.

5-1105 ENHANCEMENT OF CARCINOGEN INDUCED TOLERANCE WITH IMMUNOLOGIC ADJUVANTS AND 'CO-CARCINOGENS'. (E., Abstract) Rubin, J. A. (Wyeth Labs, Radnor, Pa.) and E. E. Livingston, Jr. Proc. Am. Assn. Cancer Res. 6:55, 1965.

5-1106 EXPERIMENTAL CARCINOMA OF THE ENDOMETRIUM. (E., Abstract) Baba, N. (Dept. Path., Ohio State U., Columbus) and J. von Hamm. Proc. Am. Assn. Cancer Res. 6:53, 1965.

5-1107 ROLE OF THE SPLEEN IN CHEMICALLY INDUCED TUMOR IMMUNITY IN INBRED MICE. (E., Abstract) Bard, D. S. (NCI, Bethesda) and J. H. Pilch. Proc. Am. Assn. Cancer Res. 6:53, 1965.

5-1108 EFFECT OF FEEDING 2-ACETYLAMINOFLUORENE ON RAT LIVER DNA PRIMING ACTIVITY WITH RNA POLYMERASE. (E., Abstract) Belman, S. (Inst. Environ. Med., New York U. Med. Ctr., N. Y.), E. Berkowitz, R. Reinhold and W. Troll. Proc. Am. Assn. Cancer Res. 6:5, 1965.

5-1109 A TRANSPLANTABLE LEUKEMIA IN RANDOM-BRED SPRAGUE-DAWLEY RATS. (E., Abstract) Bergs, V. V. (Stanford Res. Inst., Menlo Park, Cal.) and J. Scholler. Proc. Am. Assn. Cancer Res. 6:5, 1965.

5-1110 ONCOGENIC PURINE DERIVATIVES. (E., Abstract) Brown, G. B. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.) and K. Sugiura. Proc. Am. Assn. Cancer Res. 6:8, 1965.

65-1111 PRODUCTION OF EXPERIMENTAL BLADDER TUMORS. III. ABSORPTION OF C¹⁴-LABELED 3-HYDROXY-L-KYNURENINE (HKYN) AND 3-HYDROXY-ANTHRANILIC ACID (HAA) FROM THE MOUSE BLADDER. (E., Abstract) Bryan, G. T. (Dept. Clin. Oncol., U. Wisconsin Sch. Med., Madison) and C. R. Morris. Proc. Am. Assn. Cancer Res. 6:8, 1965.

65-1112 AUGMENTED VITAMIN E DIETARY INTAKE AND SPONTANEOUS TUMOR INCIDENCE IN C₃HxAK HYBRIDS AND MARSH-BUFFALO MICE. (E., Abstract) Bryson, G. (Cottage Hosp., Santa Barbara, Cal.) and F. Bischoff. Proc. Am. Assn. Cancer Res. 6:9, 1965.

65-1113 THE CARCINOGENIC EFFECT OF EGG YOLK IN MICE OF THE C57 BL STRAIN. (E., Abstract) Szepsenwol, J. (U. Puerto Rico Sch. Med., San Juan). Proc. Am. Assn. Cancer Res. 6:63, 1965.

65-1114 ENDOCRINE AND GENETIC FACTORS IN PLASMA CELL TUMOR DEVELOPMENT IN MICE. (E., Abstract) Takakura, K. (Res. Inst. Skeletomusc. Dis., New York, N. Y.), A. F. Goldberg and V. P. Hollander. Proc. Am. Assn. Cancer Res. 6:64, 1965.

65-1115 N-HYDROXY ACETYL AMINO COMPOUNDS, URINARY METABOLITES OF AROMATIC AMINES IN MAN. (E., Abstract) Troll, W. (New York U. Med. Ctr., N. Y.), E. Rinde and A. Tessler. Proc. Am. Assn. Cancer Res. 6:65, 1965.

65-1116 THE ROLE OF PARTICULATE AND VOLATILE COMPONENTS IN TOBACCO CARCINOGENESIS. (E., Abstract) Wynder, E. L. (Sloan-Kettering Inst., New York, N. Y.), D. Hoffmann and O. Auerbach. Proc. Am. Assn. Cancer Res. 6:69, 1965.

65-1117 h₂ PROTEIN-BINDING IN LIVER CARCINOGENESIS BY FLUORENYLACETAMIDE. (E., Abstract) Sorof, S. (Inst. Cancer Res., Philadelphia, Pa.), E. M. Young, R. Z. McBride and C. B. Coffey. Fed. Proc. 24(2)(Pt. 1):685, 1965.

65-1118 h₂ PROTEINS AND PROTEIN-BINDING OF CARCINOGEN IN MINIMAL DEVIATION HEPATOMAS. (E., Abstract) Sorof, S. (NCI, Bethesda), E. Young, C. Coffey and H. P. Morris. Proc. Am. Assn. Cancer Res. 6:60, 1965.

See also abstract nos.: 983, 984, 988, 989, 992, 994, 995, 1001, 1011, 1017, 1121, 1125, 1178, 1220

VIRAL CARCINOGENESIS

- 65-1119 STUDY OF THE ROUS VIRUS-CHICK EMBRYO CELL SYSTEM BY MEANS OF ANALOGS AND ANTIBIOTICS. (Fr.) Vigier, P. (Pasteur Lab., Radium Inst., Paris) and A. Goldé. Bull. Assn. Franc. Cancer 51(1):73-81, 1964.

In addition to data previously abstracted in CRA 2(1):#40 and *ibid.*, (6):#1130, 1964, the authors report that the addition of p-fluorophenylalanine (FPA; 50-100 µg/ml) to cultures of chick embryo fibroblasts at various intervals after infection with Rous sarcoma virus (RSV) inhibited both cell growth and production of virus. The inhibition was more marked the sooner FPA was added after the virus infection. When FPA was added to the cells for only 12 hr. following infection and then transferred to normal medium with phenylalanine (PA), virus production was only delayed, indicating that the analog activity was reversible. When the contact was prolonged to 24 hr., the inhibition of virus production persisted after the withdrawal of FPA and addition of PA. These results suggest that one or several proteins which are necessary for the production of RSV are synthesized during the 24 hr. following infection.

- 65-1120 ARTIFICIAL HETEROGENIZATION OF TUMOURS BY MEANS OF HERPES SIMPLEX AND POLYOMA VIRUSES. (E.) Hamburg, V. P. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow) and G. J. Svet-Moldavsky. Nature (London) 203:772-773, 1964.

Induction of new antigens in tumor cells by means of "infectious" and "oncogenic" viruses is described. Mouse Sarcoma 237 cells (originally 9,10-dimethyl-1,2-benzanthracene-induced) were infected *in vitro* with herpes simplex strain El-2 and inoc. into herpes virus-immunized (HVI), to vaccinia virus-immunized (VVI), and to non-immunized control (C) mice. Growth of tumors infected by herpes virus was specifically inhibited in the HVI mice. When Sarcoma 237 cells were exposed *in vitro* to SE polyoma virus and inj. into polyoma virus-immunized (PVI), VVI, and C mice, the growth of the polyoma-virus-infected Sarcoma 237 was specifically inhibited in the PVI mice. The immunological nature of the inhibition of heterogenized tumors was demonstrated by the passive transmission of immunity by means of lymphoid cells, i.e., C57 mice were inj. with polyoma-virus-infected cells of Sarcoma 237 48 hr. before receiving lymphoid cells from PVI or VVI mice. Tumor growth in these 2 recipient groups was 3/14 and 14/14, resp., showing transferred immunology by the lymphoid cells from PVI mice. These results show that tumor cells are artificially heterogenized by herpes and polyoma viruses, with the new, artificially induced antigens being of a specific nature. Those results of artificial heterogenization of tumor cells by means of a virus confirm the hypothesis that natural heterogenization of infected cells is a general property of viruses.

- 65-1121 PARTICIPATION OF VIRUSES IN CARCINOGENESIS. (Jap.) Hiraki, K. (Dept. Intern. Med., Okayama U. Sch. Med., Japan). Sogo Rinsho (Clin. All-round, Osaka) 13(5):885-895, 1964.

Inoculation of filtrate of the lymph nodes, liver, and spleen from an Rf mouse with spontaneous leukemia into 7-month-old isologous mice produced lymphatic leukemia (LL) in 1/12. Successive inoc. of cell-free filtrates from AKR mice with spontaneous lymphatic leukemia into isologous mice resulted in a high-incidence of leukemia which increased to practically 100% after 6 transplant generations. Transformation of this LL to other types of tumors such as myeloid leukemia, plasma cell leukemia, and reticulosarcomatosis occurred in the course of successive inoc. The participating virus was found to be of the RNA type. Autoradiographic study of the bone marrow cells (utilizing H³-uridine) revealed that RNase-treated leukemic cells contained fewer radioactive grains than leukemic cells not treated with RNase (control). The author suspected that H³-uridine is incorporated into both leukemic host cell RNA and leukemic viral RNA but because viral RNA is resistant to RNase and host cell RNA is not, RNase-treated leukemic cells contained a greater number of radioactive grains. Repeated topical skin application of MC produced transplantable skin carcinomas (43.1-88.2%), accompanied in some by leukemia (31.8-35.3%). Electron microscopy of the skin carcinoma revealed intercellular virus particles which strongly resembled leukemia viruses, hinting the possible activation of inactive proviruses in the causation of skin carcinoma. No viruses were found in benzene-induced sarcomas in Swiss mice or in MC-induced lung adenoma and s.c. sarcoma in AKR mice. A case of myeloid chloroleukemia is presented which showed, with the electron microscope, intranuclear inclusion bodies in bone marrow similar in structure to materials observed in animal malignant virus tumors or human reticulum cell sarcoma. Injection of 0.5-1.0 mg of 20-methylcholanthrene (MC) into 16 newborn AKR mice produced LL in 5 (31%) within 6 mo. (latent period for spontaneous leukemia was more than 6 mo.). MC also induced s.c. sarcoma in 9/16 and lung adenoma in 15/16. By electron microscopy, the virus particle appearing in MC-induced Rf mouse leukemia was av. 100 mµ in size with two inner and outer membranous structures; some particles contained high-electron-dense nucleus-like bodies. (See also CRA 1(7):#1343; *ibid.*, (8):#1467, 1963; and *ibid.*, (9-10):#1758, 1964.)

- 65-1122 EFFECTS OF ACTINOMYCIN D AND OF MITOMYCIN C ON THE DEVELOPMENT OF ROUS SARCOMA VIRUS. (Fr.) Vigier, P. (Pasteur Lab., Radium Inst., Paris) and A. Goldé. C. R. Acad. Sci. (Paris) 258(1)(Group. 13):389-392, 1964.

See CRA 2(6):#1130, 1964.

55-1123 STATISTICAL ANALYSIS OF SPONTANEOUS LEUKEMOGENESIS IN AKR MICE TREATED WITH IRRADIATED ISOLOGOUS LEUKEMIC EXTRACTS. (Fr.) Salmon, D. (Statist. Ctr., U. Paris Sch. Med., Sorbonne). *Ann. Inst. Pasteur (Paris)* 107(4): 557-560, 1964.

Supplementing a previous report by R. Latarjet (see CRA 2(6):#1139, 1964), the author analyzes statistically the results obtained by the latter investigator and concludes that the decrease of leukemogenesis observed in AKR mice treated with irradiated isologous leukemic extracts is significant. These results are not dependent on the sex of the animals and cannot be explained on the basis of a spontaneous decrease of leukemia which is sometimes observed in certain strains.

55-1124 INCREASED PRODUCTION OF METASTASES IN BHK₂₁C₁₃ HAMSTER CELLS AFTER INFECTION IN VITRO WITH AVIAN MYELOBLASTOSIS VIRUS. (Fr.) Lacour, F. (Dept. Immun., Gustave-Roussy Inst., Villejuif, Seine, France). *C. R. Acad. Sci. (Paris)* 259(10) (Group. 14): 1793-1796, 1964.

Of 33 newborn hamsters inoc. s.c. with 10⁶ BHK₂₁C₁₃ hamster cells infected in vitro with chick myeloblastosis virus (CMV; BAI strain) and observed until death, all presented a tumor at the inoc. site and 14/33 (44%) developed metastases (pararenal, mediastinal, inguinal and axillary lymph nodes; lung; liver). All control hamsters inoc. with equal amounts of uninfected cells presented a tumor at the inoc. site, but only 1/27 developed metastases. Both primary and metastatic tumors were fibroblastic sarcomas; morphologic aspects of rhabdomyosarcoma were observed in the tumors of hamsters inoc. with CMV-infected cells. No pathological signs were found during a 4-mo. observation period in White Leghorn chicks inoc. i.p. 24 hr. after hatching with CMV-infected cells or in newborn hamsters inoc. with plasma from CMV-infected chicks. The author suggests that the potentiation of the carcinogenic activity may be due to an associated virus.

65-1125 EFFECTS OF POLYCYCLIC AROMATIC CARCINOGENS ON VIRAL REPLICATION: SIMILARITY TO ACTINOMYCIN D. (E.) De Maeyer, E. (Dept. Virol., Rega Inst., U. Louvain, Belgium) and J. De Maeyer-Guignard. *Science* 146:650-651, 1964.

Benzo(a)pyrene (BaP) and 7,12-dimethyl-benz(a)anthracene (DMBA) inhibited the plaque formation by and the yields of the DNA viruses, the herpes virus and the vaccinia virus, but had no effect on an RNA virus, Sindbis. No such inhibition occurred with 4 related but non-carcinogenic polycyclic hydrocarbons (benzo(e)pyrene, pyrene, benz(a)anthracene, and anthracene). Selective inhibition of DNA virus replication and suppression of interferon synthesis, at doses of which do not affect the RNA virus growth, resemble the action of actinomycin D. The results suggest that DMBA

and BaP interact with DNA and impair the expression of its genetic information.

65-1126 MUTAGENICITY OF IONIC POLYMERS AND LEUKAEMOGENIC VIRUSES RELATIVE TO NUCLEIC ACIDS IN *DROSOPHILA MELANOGASTER*. (E.) Fahmy, O. G. (Chester Beatty Res. Inst., London, S.W.3) and M. J. Fahmy. *Nature (London)* 204:46-49, 1964.

The hemocoels of adult male Oregon-K stock *D. melanogaster* were inj. with various ionic polymers or cell-free extracts (mouse) of Gross virus leukemia infected lymphatic tissue (GVL), normal lymphatic tissue (NLT), Moloney virus leukemia infected plasma (MVL) or normal mouse plasma (NMP). The progeny of treated males were fractionated into broods by repeated matings to virgin females at 3-day intervals. While all the agents showed significant mutagenic activity and induced small chromosome deletions resulting in the minute phenotype at a rate which was 3-7x greater than in controls, the synthetic polymers were ineffective in inducing viable chromosome fragments. The induced frequency of sex-linked recessive visibles was statistically significant only in the GVL series. In a study of the frequency of minutes occurring during the postmeiotic stages (spermatozoa and spermatids) and during the meiotic and premeiotic stages (spermatocytes and spermatogonia), GVL was slightly more active in the late germ cells; most of the other agents showed similar activity at all stages. The mutagenicity of these agents was compared with that of DNA, RNA and deoxyribonucleoprotein (DNP). The relative activity for induction of minutes (in descending order) was NMP, MVL, GVL, NLT, DNA, DNP and RNA, and for induction of sex-linked recessive visibles it was GVL, MVL and NMP, NLT, RNA and DNP. No correlation could be made between the size or electrical charge of the molecules tested and their mutagenic efficiency. Determinations of the mutagenicity of the Moloney and Gross viruses in regards to the induction of chromosome deletions could not be made because the heterologous material (mainly soluble proteins of mouse tissue) was also active.

65-1127 "VERTICAL" TRANSMISSION OF LEUKEMIA VIRUS. (Jap.) Ida, K. (Dept. Cancer Res., Toyo Indust. Hosp., Japan), A. Fukushima, Y. Oba and S. Morita. *Sogo Rinsho (Clin. All-Round)* 13(10):1898-1902, 1964.

Sibling newborn Swiss mice were inoc. with Moloney virus. The F₁ generation of these virus-infected mice, when breast-fed by their mothers, showed a leukemia incidence of 50% (5/10 mice) with a latent period of 106-180 days. F₁ or F₂ mice, however, failed to develop leukemia when breast-fed by normal mice; F₂ mice obtained from normal parents developed leukemia when breast-fed by leukemia-infected F₁ mice. The incidence of leukemia in different litters was nearly the same regardless

of whether the mothers had manifested signs or symptoms of leukemia at the time of delivery. Only F₁ or F₂ mice breast-fed by leukemia-infected mothers developed leukemia. Leukemia also developed in normal F₁ and F₂ Swiss mice breast-fed with homologous milk from leukemia-infected Balb/c mice. Electron microscope studies revealed the presence of both mature and immature virus particles in milk-induced Swiss mouse leukemia. Passage A viruses, Moloney viruses and cylindrical and tubular particles were observed in the megakaryocytes of the spleen and in the bone marrow of such milk-induced leukemic mice.

65-1128 BASIC AND CLINICAL RESEARCH IN MALIGNANT TUMORS. II. (Jap., Abstract)

Hiraki, K. (Dept. Intern. Med., Okayama U. Sch. Med., Japan), M. Ofuji, H. Suminami, S. Irino, Z. Ota, S. Shinagawa, K. Okada, I. Miyoshi, T. Sezaki, N. Kawamura, I. Kunisada, No. Suzuki, M. Sato, N. Soda, M. Suzuki, J. Moriya, S. Osato, T. Nagamori, I. Minakawa and Y. Otomo. Nippon Naika Gakkai Zasshi (J. Jap. Soc. Intern. Med.) 53(6):663-664, 1964.

The authors reported that in X-ray-induced leukemia in young Rf mice (see CRA 1(7):#1343, 1963) virus particles were demonstrated by electron microscope. The particles were oval in shape and were 100 mμ in size. The nucleoids measured 70 mμ. Topical application of 20-methylcholanthrene on the dorsal skin of Rf mice, twice weekly for approx. 4 mo., resulted in the development of leukemia in 88.0% and skin carcinoma in 43.1%. In this skin cancer, also, virus particles measuring 100 mμ and containing electron-dense nucleoids were demonstrated. In human myeloid chloroleukemia, the authors recently observed the presence of intranuclear inclusion bodies as well as electron dense two-membraned round materials (100 mμ in diameter). These structures were surrounded by a fibrillar formation, suggesting strongly the participation of viruses in myeloid chloroleukemia. (See also CRA 1(8):#1467, 1963; ibid., 1(9-10):#1758; and ibid., 2(8):#1510, 1964.)

65-1129 STUDIES ON SL LEUKEMIC VIRUS. (Jap.)

Ichikawa, Y. (Dept. Cancer Virus., Virus Res. Inst., Kyoto U., Japan). Saishin Iqaku (Mod. Med., Osaka) 19(2):511-515, 1964.

Electron microscopic studies of SL mouse leukemia showed that virus particles were present in the cell spaces and phagocytic particles, but not in the cytoplasm or nuclei. The virus particles measured 80-95 mμ in diameter, and contained nucleoids measuring 40-50 mμ. The electron density of these nucleoids was not as high as that of nucleoids of mouse mammary carcinoma or of chicken leukosis sarcoma. (See also CRA 1(7):#1342, 1963.)

65-1130 CELL DIFFERENTIATION AND THE PRIMARY LESION IN MOUSE MAMMARY CARCINOGENESIS.

(E.) Lasfargues, E. Y. (Dept. Microbiol., Columbia U. Coll. Phys. Surg., New York, N. Y.) and M. R. Murray. Nature (London) 204:593-594, 1964.

Comparative cultivation time was determined for epithelial and stromal mouse mammary cells in monolayer cultures in Eagle's medium, 10% calf serum, and 0.5% lactalbumin hydrolysate. At various physiological stages, the cultivation time (in wk.) for milk agent-free (A-F) C57Bl, ZBC and Ax virgins was 10, 4-5, and 10, resp. In early pregnancy cultivation times for milk-agent positive (A-P) R111 and A-F C57 and ZBC were 3, 4-5 and 4-6 wk.; in late pregnancy, 2, 2-3 and 2-3; during lactation, 1, 1 and 1, resp. Cultivation time in resting A-F ZBC was 5 wk. The results, consistently reproducible, show that the mammary cell loses its replicating properties while progressing towards functional activity and complete differentiation. (See also CRA 1(3):#458, 1963.)

65-1131 VACCINE FOR LEUKAEMIA? (E.) Brit. Med. J. 2:1213-1214, 1964.

Leukemia, even if finally proved to be caused by a virus, may present exacting problems in reference to the production of a vaccine. Experimental transmission of leukemia in mice may be prevented by immunization, but the vertically transmitted (spontaneous) leukemia (from mother to offspring) is not prevented by immunization. In mouse leukemia, the virus induces formation of new virus-specific antigens by the leukemic cells, against which cytotoxic antibodies could be directed. These antigens and this immune rejection reaction are produced by an interaction between the cell and the virus (transformation) and cannot be induced by dead virus. Therefore, the vaccine would have to consist of a live virus capable of transforming the host's cells; moreover, the host would have to have an immune system capable of reacting to, and wholly rejecting, the transformed cells. One facet of the problem discussed is the recent identification of some virus or virus-like agents from human pts. as mycoplasmas (see CRA 3(4):#841, 1965). The use of monkeys in experimental work is made difficult because of the fact that so little is known about their own malignant diseases (see the following abstract).

65-1132 BONE DISEASE IN AFRICAN GREEN MONKEYS.

(E.) Wright, D. H. (Makerere U. Coll. Sch. Med., Kampala, Uganda) and T. M. Bell. Lancet 2:969-970, 1964.

A detailed description is presented of the bone and marrow changes found in an African green monkey which had received no treatment and which the authors believe to be similar to the changes seen after inj. into young African green monkeys of tumor material from a pt. with Burkitt's lymphoma (see CRA 3(1):#124, 1965).

- 65-1133 ANALYSIS OF THE VIRUS-PRODUCING INTER-ACTION OF RAT ROUS SARCOMAS (XC AND MR₅) WITH THE FOWL CELL. (E.) Chýle, P. (Inst. Exp. Biol. Genet., Czech. Acad. Sci., Prague). Folia Biol. (Praha) 10(5):359-365, 1964.

Nonlethal X-irradiation of XC rat tumor cells prior to i.m. inoc. into 8-13-day-old chicks lowered the tumor take. *In vivo* cultures, consisting of semipermeable diffusion chambers implanted into the peritoneal cavity of 3-8-week-old chicks, and containing either rat XC or MR₅ tumor cells alone or combined with normal or irradiated avian cells or vice versa (i.e., containing irradiated rat tumor and normal avian tissue), showed that virus production is induced only when both interacting cell types are intact and fully viable. The possibility of mutual fusion, i.e. vegetative hybridization of somatic cells, was considered.

- 65-1134 EXPERIMENTAL VIRAL LEUKAEMIA AS A RHYTHMIC GROWTH PROCESS. II. SYSTEMATIC FLUCTUATION OF THE ADENOSINETRIPHOSPHATE (ATP) CONTENT AND CHANGES IN THE FREE NUCLEOTIDE (ATP, ADP, AMP) POOL IN LEUKAEMIC CELLS DURING THE LEUKAEMIC PROCESS. (E.) Ríman, J. (Inst. Org. Chem. Biochem., Czech. Acad. Sci., Prague) and J. Korb. Folia Biol. (Praha) 10(5):346-358, 1964.

In White Leghorn chicks with myeloblastosis induced by the BAI strain A virus, the changes occurring in the adenosinetriphosphate (ATP) level during the leukemic process in the blood were ascertained and the ATP conc. and content in leukemic cells were determined differentially. In the resting stages of the growth periods, a significant increase in the ATP conc. was found in the leukemic cells, while in phases of abrupt growth (high mitotic activity), it was significantly lowered. These results were also reflected in characteristic changes in the proportion of the various components of the free adenine nucleotide (ATP, ADP, AMP) pool. (See also CRA 3(4):#842, 1965.)

- 65-1135 THE TEMPORAL RELATIONSHIPS OF PROTEIN AND DNA SYNTHESIS IN POLYOMA VIRUS DEVELOPMENT. (E.) Gershon, D. (Weizmann Inst. Sci., Rehovoth, Israel) and L. Sachs. Virology 24(4):604-609, 1964.

The temporal relationships of protein and DNA synthesis were studied in monolayers of 24-hour-old mouse embryo secondary cultures, which were infected with standard large plaque IL11 and small plaque SP2 polyoma virus (PV; 5×10^7 PFU/2 $\times 10^6$ cells): after 48 to 48 hours the cultures were assayed for DNA infectivity. The studies with puromycin (0.005-10.0 μ g/ml for 24-72 hr.) revealed that the protein synthesis required for PV development began 8-9 hr. after infection, while the full complement of proteins necessary

for PV maturation appeared 14-16 hr. after infection. The amount of infectious DNA began to increase 12-14 hr. after infection. A conc. of 5 μ g/ml of puromycin was shown to prevent the production of infectious DNA. The data provided evidence that early proteins appear 8-9 hr. after infection, viral DNA synthesis is initiated at 12-14 hr., late proteins necessary for virus production may be noted at 14-16 hr., and virions may be detected at 22-24 hr.

- 65-1136 SYNTHESIS OF SV40 TUMOR ANTIGEN DURING REPLICATION OF SIMIAN PAPOVAVIRUS (SV40). (E.) Rapp, F. (Dept. Virol., Baylor U. Coll. Med., Houston, Tex.), T. Kitahara, J. S. Butel and J. L. Melnick. Proc. Nat. Acad. Sci. USA 52(5):1138-1142, 1964.

Studies were performed on tissue cultures of primary green monkey kidney cells (GMK), BSC1 cells derived from the same species, hamster embryo fibroblasts (HEF) and human embryonic lung cells (HEL) which were infected with simian papovavirus 40 (SV40; 10 PFU/cell). Complement fixation and immunofluorescence tests revealed the presence of a SV40 tumor antigen synthesized in the nucleus of GMK and BSC1 cells during early stages of the replication of the virus. With progression of time, the number of GMK and BSC1 cells showing the tumor antigen decreased, while the number showing viral antigen increased. The SV40 tumor antigen was also noted in a small proportion of HEL and HEF cells; the viral antigen was also present in the former but not the latter cells. The SV40 tumor antigens detected in these tests were immunologically similar to that found in SV40 transformed 2X-10 hamster cells. (See also CRA 1(12):#2143, 1964; *ibid.*, 3(2):#311 and #312, 1965.)

- 65-1137 THE NUCLEIC ACID OF SIMIAN VIRUS 40. (E.) Crawford, L. V. (Inst. Virol., U. Glasgow, Scotland) and P. H. Black. Virology 24(3):388-392, 1964.

The DNA extracted from SV40 (strain 777), grown in BSC-1 line of monkey kidney cells, was found to be comprised of 2 components having different sedimentation coefficients. Apparently the fast component (21.2 S) has a circular configuration, while the slow component (16.1 S) has a linear configuration produced by opening the ring. As estimated from the band width in equilibrium density gradient, the molecular wt. of the DNA was 2.6×10^6 , compared to 3.2×10^6 for the slow component as estimated from its sedimentation coefficient. The size, shape and structure of the SV40 DNA were similar to those of polyoma DNA. The major difference was in the base composition which was 41% guanine + cytosine (GC) in the SV40 DNA, and 48% GC in polyoma DNA. However, the similarities are strong enough to warrant grouping of SV40 with polyoma virus rather than with the papilloma group of viruses. (See also CRA 1(2):

#264, 1963; *ibid.*, (11):#1956, 1964; *ibid.*, 2(1):#77, 1964, and *ibid.*, 3(2):#293, 1965.)

65-1138 ENHANCEMENT BY THYMIDINE ANALOGS OF SUSCEPTIBILITY OF CELLS TO TRANSFORMATION BY SV40. (E.) Todaro, G. J. (Dept. Path., New York U. Sch. Med., N. Y.) and H. Green. *Virology* 24(3):393-400, 1964.

In 3T3 cells derived from Swiss mouse embryo cultures, 5-bromo-2'-deoxyuridine (BUDR) or 5-iodo-2'-deoxyuridine (IUDR) had no effect on cell viability or transformation frequency when added to nongrowing cultures, while growing cultures lost viability in the presence of either analog to a degree dependent on the duration of exposure and the conc. The frequency of transformation of growing 3T3 cells by SV40 was increased by exposure to either analog before or after infection; hence, they do not appear to act through modification of viral growth. (See also CRA 1(12):#2144, 1964.)

65-1139 GROWTH AND MORPHOLOGY OF MOUSE LYMPHOMA CELLS IN DIFFUSION CHAMBERS. (E.) Hays, E. F. (Dept. Biophys. Nucl. Med., U. California Sch. Med., Los Angeles). *Proc. Soc. Exp. Biol. Med.* 117(1):45-50, 1964.

Diffusion chambers with Millipore membranes of 0.45 μ av. pore size containing fragments of lymphomatous or normal thymus and lymph nodes from inbred AKR/JAX and C3Hf/Bi mice (allogeneic strains) were implanted into isogeneic or allogeneic recipients of these 2 strains, and growth of the tissue fragments was noted for up to 32 wk. The growth patterns of isogeneic and allogeneic material was the same. Development of lymphocytic lymphoma occurred in 4-18 wk. in certain animals carrying chambers with tumor fragments. Due to the localization of tumor growth near the chambers and the short period between chamber implant and tumor development, it is believed that most of the neoplasms were the result of the escape of cells through the chamber membrane. Some of the malignancies might possibly have been caused by liberation of a subcellular oncogenic agent by the viable lymphoma cells.

65-1140 ONCOGENIC ACTIVITY OF ADENOVIRUS 12 IN THYMECTOMIZED BALB/c AND C3H/HeN MICE. (E.) Kirschstein, R. L. (NCL, Bethesda), A. S. Rabson and E. A. Peters. *Proc. Soc. Exp. Biol. Med.* 117(1):198-200, 1964.

Human adenovirus 12 (AV 12; 107.15 TCID₅₀) was inj. s.c. into 100 newborn C3H/HeN, BALB/c, dba and AL/N mice. No tumors were noted in an observation period of more than 1 yr. In a subsequent experiment, thymectomies were performed within 8 hr. of birth in BALB/c mice and C3H/HeN mice which 2 hr. later were inoc. s.c. with AV 12 (107.15TCID₅₀). Following a latent period

of 2-4 mo. in the former and 3-4 mo. in the latter, undifferentiated malignant tumors developed in 5/30 and 3/18, resp., which survived inoc. of AV 12. No metastases were noted at necropsy. However, no tumors were noted after 6-13 mo. in 80 BALB/c and C3H/HeN controls which survived inoc. of AV 12 and which had received no surgery or were sham-operated. It is believed that thymectomy may have impaired host immunity to the neoplastic cells induced by AV 12. (See also CRA 1(11):#1988, 1964.)

65-1141 TRANSFORMATION OF RAT EMBRYO CELLS IN CULTURE BY POLYOMA VIRUS. (E.) Williams, J. F. (Dept. Med. Biophys., U. Toronto, Canada) and J. E. Till. *Virology* 24(3):505-508, 1964.

Rat embryo cells were transformed *in vitro* by polyoma virus (small-plaque variant, TSP 1, Toronto strain). The transformed foci showed morphological differences which were inheritable for many passages, although some variations in the colonial morphology of individual subcultures occurred after some mo. Some of these cell lines formed tumors when inj. s.c. into 3-week-old Buffalo strain rats. A quantitative assay permitting the estimation of the frequency of transformation is described. The relationship between the transformation frequency and the conc. of the infecting virus was represented by a sigmoidal curve, with the max. frequency of transformation reached at viral conc. greater than 10⁹ PFU/ml.

65-1142 EXPERIMENTAL STUDY OF TUMORS OF GOLDEN HAMSTERS INDUCED BY CHICKEN ROUS SARCOMA VIRUS. (Rus.) Shevliagin, V. Ia. (N. F. Gamaley Inst. Epidemiol. Microbiol., Moscow). *Vop. Virus.* 9(5):533-537, 1964.

Isolation of Rous virus (RV) from 2 transplantable tumors of golden hamsters (induced by RV, strain Carr) was tried. RV was not isolated from the tumor strain #1 (induced by s.c. inoc. of 2-week-old hamsters with chicken tumor extract) and the blood serum of the hamsters did not contain virus neutralizing antibodies. However, RV was isolated from the primary tumor of tumor strain #2 (induced by s.c. inoc. of 2-week-old hamsters with chicken sarcoma fragments) and the first 2 passages; then the virus disappeared. Blood serum from the hamsters with primary tumor or tumors of passages 1 and 2 contained virus neutralizing antibodies. Details of the various methods employed in the attempt to grow the virus are presented.

65-1143 EVIDENCE FOR A PERSISTENT VIRAL INFECTION IN A CELL LINE DERIVED FROM BURKITT'S LYMPHOMA. (E.) Henle, G. (Virus Lab., Children's Hosp., Philadelphia, Pa.) and W. Henle. *J. Bact.* 89(1):252-258, 1965.

The EB2 cell line derived from Burkitt's lymphoma

showed a marked resistance to infection when exposed to the vesicular stomatitis virus (VSV), the Mahoney strain of poliomyelitis type 1 virus, the Ricki strain of mumps virus or the Victoria strain of Newcastle disease virus. Rapid protection against VSV was afforded to human cell cultures but not murine L cells by cell-free media obtained from EB2 cells in the presence or absence of feeder layers of human cells. The protective principle was found to comply with the present criteria for an interferon. The results indicate that EB2 cultures are latently infected with an as yet unidentified virus.

65-1144 CYTOPATHIC EFFECT OF SIMIAN VIRUS 40 ON PRIMARY CELL CULTURES OF RHESUS MONKEY KIDNEY. (E.) Easton, J. M. (NIH, Bethesda). J. Immun. 93(5):716-724, 1964.

A more detailed account of CRA 2(5):#938, 1964.

65-1145 ATTEMPT AT CLASSIFICATION OF MOUSE LEUKEMIA VIRUSES. MOUSE LEUKEMIA VIRUS TYPE A AND THE FRIEND VIRUS. (E.) Gross, L. (VA Hosp., Bronx, N. Y.). Acta Haemat. (Basel) 32(2):81-88, 1964.

In a continuation of the discussion on "mouse leukemia virus type A" presented in CRA 3(4):#817, 1965, the author showed that following the i.p. inoc. of filtrates (5%) from spleens and livers of mice with Friend-virus (FV)-induced leukemia into susceptible (DBA/2, BALB/c, C3H(f) or Swiss) mice, progressive enlargement of the spleen and liver within a few wk. is induced without the appearance of thymic tumors or the enlargement of the peripheral lymph nodes, while inoc. of the filtrates into C57BR mice or newborn Sprague-Dawley rats resulted in the development in some of lymphatic, stem-cell or myelogenous leukemia, i.e., forms induced usually by the mouse leukemia virus type A. Therefore, it is possible that the FV may be a mixture of the 2 viruses (type A and the characteristic FV). Although the Rauscher virus induced in susceptible mice a disease which was indistinguishable from that induced by FV, the Rauscher virus more readily induced lymphatic leukemia than FV in certain strains such as C57BR. The ability of the Rauscher virus to induce the FV form of leukemia was inhibited by *in vitro* neutralization of the Rauscher virus with an immune Friend rabbit serum, whereas such a serum did not inhibit the ability of the Rauscher virus to induce lymphatic leukemia. The results suggest that the Rauscher strain contains a higher component of the mouse leukemia virus type A than FV.

65-1146 CULTIVATION IN VITRO OF MYELOBLASTS FROM HUMAN LEUKEMIA. (E.) Iwakata, S. (Roswell Park Mem. Inst., Buffalo, N. Y.) and J. T. Grace, Jr. New York J. Med. 64(18):2279-2282, 1964.

The leukemic cells from the peripheral blood of a pt. with acute myelogenous leukemia were successfully propagated for more than 25 subcultures. Electron microscopy of these cells revealed particles which had the morphology of viruses and measured about 110-120 mμ in diameter.

65-1147 THE PARTICIPATION OF MOUSE LYMPHOMA VIRUS (MOLONEY VIRUS) IN THE DEVELOPMENT OF MYELOID LEUKEMIA DUE TO RADIATION. (Jap., Abstract) Yokoji, K. (Dept. Path., Hiroshima U. Sch. Med., Japan) and S. Takizawa. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(2-3):259-260, 1964.

In irradiated mice, inoc. of Gross lymphoma viruses increased the incidence of myeloid leukemia. Similarly, in male RF mice which had undergone thymectomy or systemic X-irradiation (350 r), inoc. of Moloney lymphoma viruses increased the incidence of myeloid leukemia, and in a limited number of cases brought about reticulosarcoma-like changes.

65-1148 DISTRIBUTION OF ROUS SARCOMA VIRUS IN THE AMNIOTIC MEMBRANE--STUDY OF CARCINOGENESIS IN THE CHICK EMBRYO. (Jap.) Yamamoto, T. (Inst. Res. Infect. Dis., Tokyo U. Sch. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 21(6):1220-1228, 1963.

Interferon-like substances (ILS) were extracted from Rous sarcoma virus (RSV)-infected chorioallantoic membranes and were partially purified by cold alcohol fractionation. When partially purified RSV (approx. 100 PFU) was inoc. into 10-11-day-old eggs with ILS, a decreased number of pocks was seen 7-8 days after infection but the amount of virus per pock remained the same as in controls. If ILS were added in the later stages of infection of the chorioallantoic membrane, the amount of virus per pock was decreased. Efforts to obtain the virus mutants with virus-free pocks failed after a number of passages. (See also the following abstract.)

65-1149 THE DEVELOPMENT OF ROUS TUMOR CELLS IN THE ABSENCE OF INFECTIOUS VIRUSES. (Jap.) Yamamoto, T. (Inst. Res. Infect. Dis., Tokyo U. Sch. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 22(5):1216-1227, 1964.

In addition to information given in a previous report (see preceding abstract) the author reported that the viral activity in each pock developing following admin. of interferon to the chorioallantoic membrane of Rous virus-infected fertilized chicken eggs ranged from undetectable levels (less than 3 PFU) to 10⁵ PFU. Those with undetectable amounts of Rous virus represented 40%

of the pocks examined (total 270 pocks). Transplantation of these pocks with various levels of viral activities to other chorioallantoic membranes gave rise to tumor formation in 60% and further transplantation of these tumor materials to still other chorioallantoic membranes produced tumor formation in almost 100%.

65-1150 CYTOLOGIC STUDY OF RAT LEUKEMIAS INDUCED BY THE VIRUS OF MOUSE HEMOCYTOBLASTOSIS-RETICULOSIS. (Rus.) Kolmykova, V. N. (Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR, Moscow) and L. V. Shershu'skaia. Vop. Onkol. 10(9):54-57, 1964.

Cytologic study of 78 cases of rat leukemia, induced by mouse hemocytoblastosis-reticulosis virus, and by inj. of a cell-free extract to random-bred rats, showed that in all the cases a true leukemia of the hemocytoblastosis-reticulosis type developed which was similar to that which developed in mice infected with the same virus. Hemocytoblastosis developed in 16/78, mixed forms in 31/78 and reticulosis in 31/78. Enlargement of peripheral lymph nodes was found in 38/78, of mesenteric lymph nodes in 16/78, of thyroid gland in 55/78, of spleen in 55/78, of liver in 50/78.

65-1151 A GROWTH FACTOR REQUIRED FOR THE IN VITRO CULTURE OF TUMOR CELLS INDUCED IN HAMSTER BY ADENOVIRUS 12. (Fr.) Lorans, G. (Inst. Cancer Res., Villejuif, Seine, France) and P. Tournier. C. R. Acad. Sci. (Paris) 258(1) (Group. 13):386-388, 1964.

When attempts were made to cultivate in vitro a hamster tumor induced in newborn animals by s.c. inoc. of adenovirus 12, it was found that tumor cells were able to survive and grow in Eagle's medium only after the addition of hemolyzed blood or hemoglobin. The growth factor could not be identified. This factor was not necessary for the survival and multiplication in vitro of normal hamster cells and polyoma or SV40 virus-induced tumor cells.

65-1152 EXPERIMENTAL NEOPLASMS CAUSED BY HUMAN ADENO-VIRUS. (Jap., Abstract) Yabe, Y. (Dept. Microbiol., Okayama U., Japan). Nippon Saikingaku Zasshi (Jap. J. Bact.) 18(12):501-502, 1963.

Adenoviruses types 2, 3, 7, 7a, 9, 10, 11, 12, 14, were transplanted into the pulmonary parenchyma of hamster (no details); 8/10 transplanted with adenovirus 12 (AD-12) developed malignant tumors in various sites of the chest within 33-90 days after transplantation. Cell-free filtrates of HeLa cells, through which AD-12 were passed for 1, 3, or 8 generations, induced intrathoracic tumor in 7/8, 26/27, or 6/6, resp., 29-157 days following admin. into the lungs of newborn

hamsters. Among these 39, liver tumors were also seen in 4. These tumors showed malignant change and they were highly transplantable s.c. or i.p. to other normal hamsters (e.g., from 3-7 generations). No agglutination-inhibitory antibody against polyoma virus was noticed in the tumor-bearing hamsters. AD-12, untreated or heat-treated (60°C for 30 min.), led to no vacuolization (such as that characteristic of SV40) when admin. to Midori strain monkey kidney cells. With use of the electron microscope, inclusion bodies were observed in AD-12-infected HeLa cells. Anti-SV40 serum did not neutralize AD-12-induced CPE in vitro or the carcinogenic process in hamsters. Human sera from cancer pts. (no details) were able to inhibit tumor growth in experimental animals only when they were capable of neutralizing CPE. These sera did not possess antibodies against SV40. Tumor tissues or extracts from tumor tissue in AD-12-infected hamster were not transplantable to HeLa cells. Carcinogenic susceptibility of hamster to adenovirus transplantation was decreased with age. AD-12 also created tumors in the abdomen or in the s.c. tissue after transplantation to the corresponding sites, and created hydrocephalus after transplantation into the brain. (See also CRA 1(3):#465 and #507; ibid., (5):#899, 1963; and ibid., 2(3):#516, 1964.)

65-1153 INDUCTION OF TUMOR IN HAMSTERS WITH THE USE OF HUMAN ADENOVIRUSES.

(Jap., Abstract) Yabe, Y. (Okayama U., Japan), J. J. Trentin, H. G. Taylor and S. Murakami. Birusu (Virus, Tokyo) 13(2):48-50, 1963.

See preceding abstract. (See also CRA 1(5):#900, 1963; and ibid., 2(1):#87, 1964.)

65-1154 EXPERIMENTAL STUDIES OF FILTERABLE MOUSE LEUKEMIA INDUCED BY FEEDING MALIGNANT TUMOR DIET. I. (Jap., Abstract) Hamazaki, Y. (Okayama U. Sch. Med., Japan). Birusu (Virus, Tokyo) 13(5-6):250-252, 1963.

An unspecified percentage of fasted hybrid albino rats (approx. 40 g) fed orally 1-3 g fresh homogenate of NY tumor (Yoshida sarcoma subtype) at intervals of 4-5 days or the same amount of homogenates of various human tumors, leukemias, carcinomas and hepatomas, daily or every other day, developed a transplantable, acute lymphatic leukemia, usually after 5-10 feedings. Some animals developed hypersensitivity and then agitation and died. The incidence of leukemia which resulted from the inj. of various filtrates of tumor homogenates depended on the type of filter used. Control studies (feeding of homogenates of various normal, non-cancer tissues or heat-treated tumor tissues) all failed to induce leukemia. (See also CRA 2(3):#497, 1964.)

65-1155 EXPERIMENTAL INDUCTION OF LYMPHATIC LEUKEMIA IN RATS THROUGH FEEDING TEST

WITH MALIGNANT NEOPLASMS. (Jap.) Hamazaki, Y. (Okayama U. Sch. Med., Japan). Saibokaku Jyorigaku Zasshi (J. Karyopath.) 8(2):95-102, 1963.

When young albino rats (40-60 g) were fed homogenates of NY sarcoma (1-3 g p.o. 2x/wk.) approx. 20-30% of the rats developed signs of restlessness and agitation within a wk. and died within another 24 hr. When homogenates of the spleen, liver, lymph nodes and brain of these rats were inj. i.p. into adult Donryu or hybrid albino rats, transplantable, lymphatic leukemia developed within 2 wk. Various filtration processes indicated that the leukemogenic agent was filterable. The p.o. admin. of preheated homogenate (60°C for 30 min.) or i.p. inj. of ether-treated homogenate (24 hr. at 0°C) did not cause leukemia. Storage of leukemic spleen and lymph nodes in 50% glycerol at -30°C showed retention of leukemogenic ability, indicating that the leukemogenic substance is likely a virus. The appearance of leukemia, but no tumors, following inoc. of leukemic homogenates seems to indicate that whereas tumor cells do not migrate out of the digestive tract, a subcellular substance (leukemogenic agent) does. (See also CRA 2(3):#497, 1964.)

65-1156 EXPERIMENTAL STUDIES OF MOUSE LEUKEMIA INDUCED BY INGESTION OF HUMAN MALIGNANT TUMOR. REPORT 7. SYMPTOMATOLOGY OF ANIMALS INGESTING EXPERIMENTAL DIET AND THE INCIDENCE OF LEUKEMIA. (Jap.) Hamazaki, Y. (Okayama U. Sch. Med., Japan). Sogo Rinsho (Clin. All-Round) 13(10):1906, 1964.

The incidence of leukemia in young albino rats after feeding human malignant tumor(s) (no details), 1 g/day, was reported. Evidence of leukemia was demonstrated in 0/3 rats which died within a day after a day's feeding, in 1/9 which died after 2-3 days' feeding, in 5/6 which died with signs of extreme agitation after 4-7 days' feeding, in 3/7 which died without signs of irritability after 4-7 days' feeding, in 2/4 which died debilitated after 8 days' feeding, and 0/6 which remained asymptomatic. The av. incidence of leukemia was 31.4%, or 11/35. Homogenates of internal organs obtained from those rats developing leukemia, when inj. i.p. in Donryu rats, induced leukemia after 2-4 wk.; leukemia rarely developed in survivors after 3 mo.

65-1157 EXPERIMENTAL RESEARCH ON THE INDUCTION OF ALBINO RAT LEUKEMIA BY MALIGNANT TUMOR DIET. VII. LONG TERM PASSAGE EXPERIMENT. (Jap., Abstract) Hamazaki, Y. (Okayama U. Sch. Med., Japan). Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):60, 1964.

In addition to the information furnished in the preceding abstract the author reported that 4/11 cases of leukemia had been transplantable for 6 mo. up to the time of the report. Generally, the leukemogenic power was increased as the leukemia was passed through repeated generations.

65-1158 EXPERIMENTAL STUDIES OF LEUKOSIS IN RATS INDUCED BY ORAL FEEDING OF HUMAN MALIGNANT TUMORS. (Jap.) Hamazaki, Y. (Okayama U. Sch. Med., Japan), M. Nanba and S. Okumura. Sogo Rinsho (Clin. All-Round) 14(1):179-180, 1965.

The authors report that the leukosis induced in rats by oral feeding of human stomach carcinoma tissue and the original carcinoma possessed a common antigen. The induced leukosis and the serum of a pt. with acute lymphatic leukemia also shared a common antigen to some degree. The implication of these findings is not known.

65-1159 SOME PROBLEMS CONCERNING THE *IN VIVO* PROLIFERATION OF TUMOR VIRUSES AND THE DEVELOPMENT OF RESEARCH IN TISSUE CULTURE. (Jap.) Tsubura, Y. (Dept. Path., Nara Prefect. Coll. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 22(5):1228-1240, 1964.

The relative incidence of the 4 histologic types of spontaneous mammary carcinoma found in ddj mice was: acinar type 43%, papillary type 47%, medullary type 9%, and adeno-acanthoma 1%. Electron microscope studies, which disclosed mammary carcinoma virus particles in the tumor, and the frequent occurrence of spontaneous mammary carcinoma among ddj strain mice both suggested the presence of viruses in this strain, although an assay for a milk factor using C57BL newborn mice was negative. A study of the relationship between the number of full-term pregnancies of the mother mice and the incidence of mammary carcinoma in the offspring in ddj strain mice showed that the greater the number of such pregnancies, the shorter the latent period, i.e., 10.9 mo. for Para 0, and 7.0 mo. for Para 7; incidence was 35.8% for Para 0, and 100% for Para 7. No significant difference in the incidence of mammary carcinoma was found between the offspring born to young mother mice (age <7 mo.; 43%), and those born to older mother mice (age >8 mo.; 54%). In dd0 and ddj mice, the ten-fold dilution of the filtrates decreased the incidence of leukemia and prolonged the latent period. There was no difference in the incidence of leukemia in ddj mice when the Moloney leukemia virus used for inoc. was collected from mice which developed leukemia earlier than 99 days compared to those which developed leukemia after 150 days (43% and 45%, resp.). Inoculation (no details) of cell-free filtrates obtained from Yoshida sarcoma into F1 newborn dd0 and AKR mice induced lymphatic leukemia. Here, the author feels that the cell-free Yoshida sarcoma filtrate accelerated the development of leukemia. (See also CRA 3(4):#667, 1964.)

65-1160 GENETIC BASIS OF SUSCEPTIBILITY TO VIRAL LEUKAEMOGENESIS. (E.)

Lilly, F. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.), E. A. Boyse and L. J. Old. Lancet 2:1207-1209, 1964.

C3Hf/Bl mice, of blood group H-2 (histocompatibility-2) kk, when inoc. at age 3-5 days with Passage A Gross virus, all developed leukemia within 87 days. After similar inoc. of a group of C57BL mice (H-2 bb), only 1% developed leukemia in 87 days, 26% in 304 days. Among their reciprocal F₁ hybrids (H-2 kb), less than 10% had become leukemic 320 days after inoc. with Passage A virus. In backcross and F₂ generations typed for H-2 by hemagglutination, homozygous kk mice were found to be highly susceptible to Gross virus-induced leukemia. Mice lacking k (bb) or heterozygous for k (kb) were much more resistant. H-2 type, as a single gene or a group of closely linked genes, is a major determinant of susceptibility to Gross virus leukemia. The association between histocompatibility factor and susceptibility to leukemia in the mouse suggests a possible similar association in man.

65-1161 THE PRESENCE OF VIRAL PARTICLES IN ORGAN CULTURES OF LONG DURATION OF MOUSE LYMPHOID LEUKEMIA. (Fr.) Cuminge, D. (Dept. Exp. Embryol., Coll. France, Paris) and N. Pourreau-Schneider. C. R. Acad. Sci. 259(17) (Group 14):2933-2934, 1964.

The presence of intra- and extracytoplasmic viral particles was observed in mouse lymphoid leukemia tissue maintained in organ cultures for a period of 3 mo. Detailed electron microscope findings are reported. It is concluded that the viral agent is not only maintained but develops in leukemic tissues cultivated in this manner for long periods.

65-1162 MORPHOLOGICAL ALTERATIONS IN CHICK FIBROBLASTS OCCURRING DURING CONVERSION BY ROUS SARCOMA VIRUS IN VITRO. (E., Abstract) Terry, R. B. (Dept. Zool., U. Illinois, Urbana). J. Cell Biol. 23(2):94A-95A, 1964.

65-1163 THERMOLABILE SV40 INFECTIVITY ASSOCIATED WITH CONTAMINATED ADENOVIRUS 4 PREPARATIONS. (E., Abstract) Easton, J. M. (NIH, Bethesda), D. E. Moore and C. W. Hiatt. Fed. Proc. 24(2) (Pt. 1):174, 1965.

65-1164 PASSIVE IMMUNIZATION OF NEWBORN HAMSTERS AGAINST THE ONCOGENIC EFFECT OF ADENOVIRUS TYPE 12. (E., Abstract) Trentin, J. J. (Baylor U. Coll. Med., Houston, Tex.), E. Bryan and L. Samper. Fed. Proc. 24(2) (Pt. 1):174, 1965.

65-1165 TUMOR ANTIGENS IN NEOPLASMS INDUCED IN HAMSTERS BY ADENOVIRUS TYPES 3 AND 7. (E., Abstract) Huebner, R. J. (NIH, Bethesda), R. M. Chanock, M. J. Casey, W. T. Lane and H. C. Turner. Fed. Proc. 24(2) (Pt. 1):174, 1965.

65-1166 IN VITRO TRANSFORMATION AND IMMUNO-FLUORESCENCE WITH HUMAN ADENOVIRUS TYPE 12 IN RAT AND RABBIT KIDNEY CELLS. (E., Abstract) Levinthal, J. D. (Harvard Sch. Med., Boston, Mass.) and W. Petersen. Fed. Proc. 24(2) (Pt. 1):174, 1965.

65-1167 VIRUS-LIKE PARTICLES IN HUMAN PLASMA AND SERUM FROM LEUKEMIC, HEPATITIC, AND CONTROL PATIENTS. (E., Abstract) Prince, A. M. (VA Hosp., West Haven, Conn.) and W. R. Adams. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1168 PROPERTIES OF POLYOMA VIRUS FROM A "SPONTANEOUS" HAMSTER TUMOR. (E., Abstract) Takemoto, K. K. (NIH, Bethesda), K. Habel and P. Fabisch. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1169 DEMONSTRATION OF ROUS-INTERFERING AGENTS FROM HUMAN LEUKEMIC BONE MARROW. (E., Abstract) Plotkin, S. A. (Wistar Inst., Philadelphia, Pa.), F. Jensen and H. Koprowski. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1170 LACTIC DEHYDROGENASE PATTERNS IN MURINE VIRUS-INDUCED LEUKEMIA. (E., Abstract) Weaver, W. J. (Dept. Path., U. Oregon Sch. Med., Portland), V. L. Weimar, F. A. Roberts and B. V. Siegel. Fed. Proc. 24(2) (Pt. 1):210, 1965.

65-1171 A NEW METHOD FOR PURIFYING A MURINE LEUKEMIA VIRUS. (E., Abstract) Friend, C. (Sloan-Kettering Inst., New York, N. Y.) and E. De Harven. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1172 PURIFICATION OF A MURINE LEUKEMIA VIRUS BY CENTRIFUGATION IN POLYMER DENSITY GRADIENTS. (E., Abstract) Oroszlan, S. (Albert Einstein Med. Ctr., Philadelphia, Pa.) and M. A. Rich. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1173 SOME SEROLOGIC RELATIONSHIPS OF THE M-P LYMPHOCYTOPENIC VIRUS. (E., Abstract) Padnos, M. (Waldemar Med. Res. Found., Woodbury, L. I., N. Y.), N. Molomut and V. Satory. Fed. Proc. 24(2) (Pt. 1):175, 1965.

65-1174 SPONTANEOUS LEUKEMIA IN GERM-FREE AKR MICE. (E., Abstract) Pollard, M. (Lobund Lab., U. Notre Dame, Ind.), B. A. Teah and M. Kajima. Fed. Proc. 24(2) (Pt. 1):308, 1965.

65-1175 CONCERNING THE HELICITY OF SHOPE VIRUS INDUCED ARGINASE AND ITS SIGNIFICANCE.

, Abstract) Rogers, S. (Oak Ridge Nat. Lab.,
nn.). Fed. Proc. 24(2) (Pt. 1):309, 1965.

-1176 VISCERAL LYMPHOMATOSIS. A MALIGNANCY
OF THE BURSA-DEPENDENT LYMPHOID TISSUE.
, Abstract) Peterson, R. D. A. (Pediat. Res.
o., U. Minnesota, Minneapolis), B. R. Burmester
d H. G. Purchase. Fed. Proc. 24(2) (Pt. 1):308,
55.

-1177 RESPONSE, IN VITRO, OF HUMAN, MOUSE AND
HAMSTER CELLS TO INFECTION WITH ADENO-
VIRUS TYPE 12. (E., Abstract) Van Hoosier,
L., Jr. (Baylor U. Coll. Med., Houston, Tex.),
Kitamura, M. Takahashi, C. Gist, H. G. Taylor
d J. J. Trentin. Fed. Proc. 24(2) (Pt. 1):308,
55.

-1178 URIDINE- H^3 AUTORADIOGRAPHIC STUDY OF
VIRAL LYMPHOMA. (E., Abstract)
naka, T. (City of Hope Med. Ctr., Duarte, Cal.).
d. Proc. 24(2) (Pt. 1):308, 1965.

-1179 THYMIDINE KINASE ACTIVITY IN MOUSE
EMBRYO CELLS INFECTED WITH POLYOMA VIRUS.
, Abstract) Sheinin, R. (Dept. Med. Biophys.,
tario Cancer Inst., Toronto, Canada). Fed.
oc. 24(2) (Pt. 1):309, 1965.

-1180 ELECTRON MICROSCOPE RADIOAUTOGRAPHY OF
POLYOMA VIRUS INFECTION. (E., Abstract)
Harven, E. (Sloan-Kettering Inst., New York,
Y.), E. Borenfreund and A. Bendich. Fed. Proc.
24(2) (Pt. 1):309, 1965.

-1181 CYTOLOGICAL AND CYTOCHEMICAL TRANS-
FORMATION INDUCED BY PR 8 INFLUENZA
VIRUS IN CULTURES OF MOUSE CELLS. (E., Abstract)
euchtenberger, C. (Swiss Inst. Cancer Res.,
usanne, Switzerland) and R. Leuchtenberger.
ed. Proc. 24(2) (Pt. 1):309, 1965.

-1182 ENZYME INDUCTION IN POLYOMA-INFECTED
MOUSE EMBRYO CELLS. (E., Abstract)
it, S. (Dept. Biochem. Virol., Baylor U. Coll.
ed., Houston, Tex.), P. M. Frearson and D. R.
ubbs. Fed. Proc. 24(2) (Pt. 1):596, 1965.

-1183 TUMOR INDUCTION IN TRANSPLANTED TOOTH
BUDS INFECTED WITH POLYOMA VIRUS.
(E., Abstract) Main, J. H. P. (NIH, Bethesda),
J. Dawe and H. R. Stanley. Fed. Proc.
4(2) (Pt. 1):684, 1965.

-1184 DEVELOPMENT OF LEUKEMIA IN AXENIC
MICE INOCULATED WITH HUMAN LEUKEMIC
TISSUE. (E., Abstract) Nielsen, A. (Dept. Anat.,

U. Kansas Sch. Med., Kansas City), A. Chapman,
H. Cohen, W. Larsen and A. Werder. Fed. Proc.
24(2) (Pt. 1):685, 1965.

65-1185 ONCOGENICITY OF ROUS SARCOMA FOR RATS
AND MONKEYS. (E., Abstract) McClure,
H. M. (Dept. Path., U. Wisconsin, Madison) and
J. L. Van Lancker. Fed. Proc. 24(2) (Pt. 1):684,
1965.

65-1186 THE EFFECTS OF FLUOROCARBON LEUKEMIA-
VIRUS PREPARATIONS. (E., Abstract)
Kirsten, W. H. (Dept. Path., U. Chicago, Ill.),
T. W. Borun and L. A. Mayer. Proc. Am. Assn.
Cancer Res. 6:35, 1965.

65-1187 THE ANTIGEN RESPONSIBLE FOR ACQUIRED
RESISTANCE TO SPONTANEOUS MAMMARY
CARCINOMAS IN MICE. (E., Abstract) Lavrin, D.
(Dept. Bact., U. California, Berkeley),
M. Dezfulian and D. W. Weiss. Proc. Am. Assn.
Cancer Res. 6:38, 1965.

65-1188 DIRECT ACTION OF A LEUKEMOGENIC VIRUS
ON THE THYMUS. (E., Abstract)
Lieberman, M. (Dept. Radiol., Stanford U. Sch.
Med., Palo Alto, Cal.), N. Haran-Ghera and H. S.
Kaplan. Proc. Am. Assn. Cancer Res. 6:40, 1965.

65-1189 THE RELATIONSHIP OF THE B PARTICLE TO
THE MAMMARY TUMOR AGENT. (E., Abstract)
Miroff, G. (Rockefeller Inst., New York, N. Y.)
and B. Magdoff-Fairchild. Proc. Am. Assn. Cancer
Res. 6:45, 1965.

65-1190 THE IN VITRO s-RNA METHYLASE ACTIVITY
OF SV-40 INDUCED HAMSTER TUMORS.
(E., Abstract) Mittelman, A. (Roswell Park Mem.
Inst., Buffalo, N. Y.), D. S. Yohn, R. H. Hall
and J. T. Grace, Jr. Proc. Am. Assn. Cancer Res.
6:45, 1965.

65-1191 AN INTERFERING FACTOR ASSOCIATED WITH
RESISTANCE TO INFECTION TO MOUSE MAMMARY
TUMOR VIRUS (MTV). (E., Abstract) Nandi, S.
(Cancer Res. Genet. Lab., U. California, Berkeley).
Proc. Am. Assn. Cancer Res. 6:48, 1965.

65-1192 FACTORS AFFECTING THE MORPHOLOGY OF
MURINE LEUKEMIA VIRUSES. (E., Abstract)
Schidlovsky, G. (Chas. Pfizer & Co., Inc., Maywood,
N. J.) and S. A. Mayyasi. Proc. Am. Assn. Cancer
Res. 6:56, 1965.

65-1193 POSSIBLE RELATIONSHIP BETWEEN BITTNER
MILK AGENT AND A SPECIFIC SERUM ANTIGEN
IN MICE. (E., Abstract) Bernfeld, P. (Bio-Res.

Inst., Cambridge, Mass.) and R. E. Bieber. Proc. Am. Assn. Cancer Res. 6:5, 1965.

65-1194 SEROLOGIC STUDIES OF THE MOUSE MAMMARY TUMOR VIRUS (MTV). (E., Abstract)
Blair, P. B. (Dept. Bact., U. California, Berkeley). Proc. Am. Assn. Cancer Res. 6:6, 1965.

65-1195 STUDIES ON VIRUS ISOLATED FROM BOVINE OCULAR SQUAMOUS CELL CARCINOMA (CANCER-EYE) PRECURSOR ('PLAQUE') LESIONS. (E., Abstract)
Bowen, J. M. (U. Texas M. D. Anderson Hosp., Houston), R. G. Hughes, P. L. Langford, J. Angermann, W. O. Russell, J. A. Sykes and L. Dmochowski. Proc. Am. Assn. Cancer Res. 6:7, 1965.

65-1196 IMMUNITY AGAINST SKIN ISOGRAFTS FROM MICE WITH A VIRUS-INDUCED LEUKEMIA. (E., Abstract) Breyere, E. J. (American U., Washington, D. C.) and L. B. Williams. Proc. Am. Assn. Cancer Res. 6:7, 1965.

65-1197 INFLUENCE OF THYMECTOMY AND GONADECTOMY ON ADENOVIRUS-12 ONCOGENESIS IN SYRIAN HAMSTERS. (E., Abstract) Yohn, D. S. (Roswell Park Mem. Inst., Buffalo, N. Y.), C. A. Funk and J. T. Grace, Jr. Proc. Am. Assn. Cancer Res. 6:70, 1965.

65-1198 PURIFICATION OF RAUSCHER MOUSE LEUKEMIA VIRUS BY CHROMATOGRAPHIC COLUMN. (E., Abstract) Zera, H. M. (Chas. Pfizer & Co., Inc., Maywood, N. J.) and D. B. Smith. Proc. Am. Assn. Cancer Res. 6:71, 1965.

65-1199 APPLICATION OF A SPLEEN FOCUS METHOD TO QUANTITATIVE IMMUNOLOGICAL STUDIES WITH FRIEND LEUKEMIA VIRUS. (E., Abstract)
Steeves, R. A. (Dept. Med. Biophys., U. Toronto, Canada) and A. Axelrad. Proc. Am. Assn. Cancer Res. 6:61, 1965.

65-1200 A HERPES-LIKE VIRUS IN LYMPHOMA CELLS IN CULTURE. (E., Abstract) Stewart, S. E. (NCI, Bethesda), E. Lovelace, J. Whang and J. Landon. Proc. Am. Assn. Cancer Res. 6:62, 1965.

65-1201 ULTRA-STRUCTURAL CHANGES IN CAM FOLLOWING ROUS VIRUS INFECTION. (E., Abstract) Sweeney, P. R. (Sask. Res. Unit Nat. Cancer Inst. Canada, Saskatoon) and R. Bather. Proc. Am. Assn. Cancer Res. 6:63, 1965.

65-1202 INFECTION OF BALB/c MICE WITH A MAMMARY-NODULE-INDUCING VIRUS. (E., Abstract) Pitelka, D. R. (Cancer Res. Genet. Lab., U. California, Berkeley), K. B. DeOme and H. A. Bern. Proc. Am. Assn. Cancer Res. 6:51, 1965.

65-1203 CHANGES IN SPLENIC LIPOLYTIC ACTIVITY FOLLOWING FRIEND LEUKEMIA VIRUS (FLV) INFECTION. (E., Abstract) Regelson, W. (Roswell Park Mem. Inst., Buffalo, N. Y.) and J. Stein. Proc. Am. Assn. Cancer Res. 6:52, 1965.

65-1204 IMMUNOLOGICAL STUDIES ON MURINE LEUKEMIA VIRUSES. (E., Abstract) Rich, M. A. (Cancer Res. Lab., Albert Einstein Med. Ctr., Philadelphia, Pa.) and J. Geldner. Proc. Am. Assn. Cancer Res. 6:53, 1965.

65-1205 DENSITY GRADIENT CENTRIFUGATION OF AVIAN MYELOBLASTOSIS VIRUS AND THE SUBSTRATE SPECIFICITY OF THE VIRAL ATPase. (E., Abstract) Slechta, L. (Upjohn Co., Kalamazoo, Mich.). Proc. Am. Assn. Cancer Res. 6:59, 1965.

65-1206 THE ROLE OF THE MILK AGENT IN THE DISAPPEARANCE OF MAMMARY TUMORS IN INBRED C3H/SiWi MICE. (E., Abstract) Smith, G. H. (Brown U., Providence, R. I.). Proc. Am. Assn. Cancer Res. 6:60, 1965.

See also abstract nos.: 985, 987, 988, 989, 991, 995, 1013, 1037, 1055, 1056, 1063, 1109

EPIDEMIOLOGY AND BIOMETRY

65-1207 CLINICAL AND MORPHOLOGICAL PARALLELS IN DIFFUSE POLYPOSIS OF THE RECTUM AND LARGE INTESTINE. (Rus.) Rivkin, V. L. (Dept. Proctol., P. A. Herzen Nat. Inst. Oncol., Moscow) and Iu. M. Slavin. Vop. Onkol. 10(10): 1-30, 1964.

Familial associations were seen in 19/62 pts. with diffuse polyposis of the rectum and large intestine. In the pts. with adeno papillomatous polyposis, polyps with malignization or infiltrative cancer were observed in 5/20 or 3/20, resp., while in the pts. with the mixed form of polyposis, the values were 4/32 or 8/32, resp. Of these 11 pts. with invasive cancer 5 had adenocarcinoma, while 6 showed typical polyp with transition into cancer.

65-1208 STUDIES OF ETIOPATHOGENIC FACTORS IN BRONCHOPULMONARY CANCER. (Fr.) Neles, S. (Inst. Oncol., Bucharest, Rumania) and V. Dragon. Neoplasma (Bratisl.) 11(1):63-69, 1964.

Among 264 pts. with bronchopulmonary cancer (247 men and 17 women; age 25-84 yr. with 84.5% > 50) observed at the Oncologic Institute of Bucharest during 1957-1962, 232 (86.2%) were smokers (227 men and 5 women). Of these, 114 pts. were moderate smokers (up to 20 cigarettes/day), while the rest were heavy smokers (>20 cigarettes/day); 7.4% had smoked for over 10 yr. A study of the distribution by profession or occupation showed that only 19.7% worked under unfavorable conditions. The majority (62.5%) came from urban environments; the rest lived in rural communities. This difference is of etiologic significance, since in Rumania 68% of the people live in the country. There was no significant correlation with eating habits, previous pathologic conditions, or the fact that many lived in cramped living quarters.

65-1209 PATHOLOGY OF TUMOURS IN CHILDREN. THE PATTERN OF NEOPLASIA IN CHILDREN. (E.) Eward, J. K. (Dept. Child Health Path., U. Manchester, England). J. Clin. Path. 17(4): 307-410, 1964.

In 1961, tumors were the third most common cause of death in children aged 1-15 yr. in England and Wales. Although neoplasms have increased in importance relative to other diseases in children particularly since the introduction of anti-infectives, the absolute tumor incidence probably has remained the same during the past 30 yr. Among a total of 890 cases registered in Manchester during 1953-1962, there were 324 reticuloendothelial neoplasms (including 250 cases of leukemia, 23 Hodgkin's disease, 22 lymphosarcoma, etc.), 245 nervous system tumors (including 150 gliomas), and 107 connective tissue tumors.

65-1210 LEUKOSES AND PSEUDOLEUKEMIC LYMPHOID SYNDROMES IN CHILDHOOD. (Sp.)

Temesio, N. (Dr. Luis Morquio Inst. Clin. Pediat., U. Montevideo Sch. Med., Uruguay), J. Lorenzo y de Ibarreta, O. Garófalo, W. T. Giguens, A. Pérez-Scremini, P. Vila-Vidal and R. M. Vilanova. Arch. Pediat. Urug. 35(8):473-508, 1964.

In the Republic of Uruguay leukemia represented 47% (159/333) of deaths due to neoplasms and 0.8% (159/20,490) of all deaths occurring in the 0-14 yr. age group during the period 1955-60. From 1956 to June of 1963, 100 cases of leukemia in children came under observation at the Luis Morquio Institute; 69 were males and 31 females and 49/100 were in the 0-6 yr. age group. One child was mongoloid. Included are data on the symptomatology, etiology, pathology, cytology and therapy of leukemia and pseudoleukemic lymphoid syndromes in children.

65-1211 STATISTICAL SURVEYS OF DEATHS DUE TO MALIGNANCIES AMONG ATOMIC BOMB CASUALTIES: REPORT IV. (Jap.) Oho, G. Nagasaki Igakkai Zasshi (Nagasaki Med. J.) 38(Suppl.):117-130, 1963.

The rate of total deaths in Hiroshima during the period 1951-60 due to malignancies among those exposed was higher than that among those not exposed in Hiroshima, among the general public of Hiroshima Prefecture, or among the general public of Japan. Disease entities accounting for this higher rate were malignancies of the gastrointestinal, respiratory, lymphatic, and hematologic systems. More specifically, they included carcinoma of the stomach, hepatoma, lung cancer, leukemia and aleukemic leukemia. Among females exposed to the explosion, the rates of death due to malignancies of the breast, genital organ, lymphatic and hematopoietic systems and including mammary carcinoma, ovarian carcinoma, leukemia, and aleukemic leukemia were higher than in the other population groups cited. The rate of deaths due to leukemia or aleukemic leukemia rose in proportion to the closeness to the hypocenter, whereas the rates of death due to other malignancies were not necessarily related to the distance. Among those dying of carcinomas were many who had moved in and out of the hypocenter area immediately following the explosion. From these findings, the author suspects that leukemia or aleukemic leukemia was related to direct primary radiation, while the other malignancies were produced by secondary radiation from the environment.

65-1212 THE INCIDENCE OF LEUKEMIA AMONG INDIVIDUALS EXPOSED TO THE ATOMIC EXPLOSION IN HIROSHIMA. (1946-1962). (Jap.) Watanabe, S. (Med. Res. Atomic Rad., Hiroshima U. Sch. Med., Japan). Hiroshima Igaku (J. Hiroshima Med. Assn.) 17(7):730-733, 1964.

See CRA 2(2):#359, 1964.

- 65-1213 FAMILIAL LEUKEMIA. (Jap.) Miyata, H. (Dept. Radiol. Health, U. Tokyo Sch. Med., Japan) and H. Enomoto. Rinsho Ketsueki (Jap. J. Clin. Hemat.) 5(Suppl.):15-26, 1964.

Twenty-nine instances of leukemia affecting two members of the same family in Japan were collected by the authors. In 7 instances leukemia occurred in a parent and child; in 11 in two siblings; in 2 in a grandparent and grandchild; in 6 in an uncle or aunt and nephew or niece; and in 3 in two cousins. Myeloid leukemia was the most frequent type, with the acute form approx. twice as frequent as the chronic form. Of 13 instances where the leukemic type was known for both members of the same family, there were 9 instances in which both had myeloid leukemia.

- 65-1214 SOME FEATURES OF BREAST CANCER AND THYROID DEFICIENCY. REPORT OF 280 CASES. (E.) Backwinkel, K. (Dept. Surg., Jackson Clin., Madison, Wis.) and A. S. Jackson. Cancer 17(9):1174-1176, 1964.

Of 280 pts. with breast cancer, 52 (18.5%) were found to be hypothyroid and 228 (81.4%) were euthyroid. However, the mean av. age for the former pts. (64 yr.) exceeded that of the latter pts. (57 yr.) by 7 yr. and therefore, these results defy the possible precancerous or predisposing potentialities of hypothyroidism. The actual survival time for the pts. who died was 30 mo. for the euthyroid and 35 mo. for the hypothyroid pts., but hypothyroid pts. with metastases showed a significantly lower (6.7 mo.) survival time compared to the euthyroid pts. (20.7 mo.). This raises the question whether thyroid deficiency favors metastatic growth.

- 65-1215 THE RELATIONSHIP OF BREAST DISEASE TO THYROID DISEASE. (E.) Humphrey, L. J. (Dept. Surg., U. Illinois Coll. Med., Chicago) and M. Swerdlow. Cancer 17(9):1170-1173, 1964.

Of 196 women having a thyroidectomy (thyrox.) for hyperthyroidism or nontoxic goiter who were followed for 12 yr., none have developed cancer of the breast. A past history of thyroid disease, including thyrox., was present in 12% of 369 pts. operated on for carcinoma of the breast. There was a greater incidence of large-duct epithelial hyperplasia in pts. with previous thyroid disease (29%) than in pts. without previous disease (14%), while in pts. with breast cancer, no significant histological differences were noted between those pts. with or without previous thyroid disease except for a lower incidence of papillomas in those with thyroid disease.

- 65-1216 SILICOSIS AND CANCER OF THE LUNG IN HOKKAIDO. I. REPORT OF 50 AUTOPSY CASES OF SILICOSIS. (Jap.) Takeda, K. (Dept. Path., Hokkaido U. Sch. Med., Japan), K. Kikuchi,

H. Kobayashi, M. Aizawa, T. Kodama and Y. Toyofuku. Gan No Rinsho (Jap. J. Cancer Clin.) 10(8):627-636, 1964.

Carcinoma of the lung was associated with 10/50 (20%) autopsy cases of pulmonary silicosis found in Hokkaido during 1955-63. This compares with an incidence of 8.3% among a total of 3,557 autopsies performed in various medical schools and other major hospitals in 1960 and to 1.6% of deaths due to lung carcinoma (174 cases per 10,649.7 deaths per 100,000) in all of Japan. This high pulmonary silicosis-cancer association was not related to any particular age, to duration of exposure to dust, or to pulmonary tuberculosis. Most pts. worked in metal mines, but no correlation with any specific metal was possible. The coexisting silicosis was usually mild to moderate in severity. The possibility that some cases of carcinoma may have been caused by radioactive agents has not been completely ruled out. (See also CRA 2(5):#974, 1964, and *ibid.*, 3(4):#1258, 1965.)

- 65-1217 THYROID DISEASES IN A MEDICAL SURVEY OF ADULTS IN NAGASAKI. (1960-1962). (Jap.) Neritani, S. (Atom Bomb Casualty Comm., Nagasaki, Japan), R. Niitani and G. N. Burrow. Hiroshima Igaku (J. Hiroshima Med. Assn.) 17(7):695-698, 1964.

A 2-yr. survey (July 1960 to June 1962) of a total of 4,172 (1,730 males and 2,442 females), in Nagasaki exposed or not to the atomic blast, revealed 7 cases of carcinoma of the thyroid. By June 1963, 3 additional cases of carcinoma of the thyroid were observed. Of the 10 cases reported, 9 had been exposed to the blast at distances ranging from 562-1,499 m; age range at the time of exposure was 1-18 yr.; the latency period was 12-17 yr. The histopathologic distribution of the 10 thyroid cancer cases was 2 follicular adenocarcinomas, 4 papillary-follicular carcinomas, and 4 papillary carcinomas.

- 65-1218 EARLY STAGES OF CARCINOMA OF THE STOMACH. (Jap.) Matsumoto, M. (Dept. Gastrointest., Toranomon Hosp., Tokyo, Japan). Nippon Iji Shinpo (Jap. Med. J.) (2094):3-9, 1964.

In a gastric X-ray survey conducted among 249 Japanese pts., 2 cases of carcinoma of the stomach were found. All examined subjects were >40 yr. old and presented no clinical signs or symptoms suggestive of carcinoma of the stomach. Histologic examination of the stomach in 39 autopsied cases of gastric polyps revealed 4 cases showing carcinomatous changes. In a total of 15 autopsied cases manifesting a board-like elevation on the wall of the stomach, there were 6 cases showing carcinomatous changes.

- 65-1219 CANCER OF THE HEAD AND NECK IN CHILDREN. (E.) Sutow, W. W. (Dept.

diat., U. Texas, M. D. Anderson Hosp., Houston). *A.M.A.* 190(5):414-416, 1964.

778 children (all 14 yr. or younger) examined at the M. D. Anderson Hosp. and Tumor Institute in Houston, Texas, 193 had acute leukemia, 99 had lymphomas and 486 had other kinds of malignant diseases. Of the total number of pts., the highest frequency of tumor involvement was in 10 (27%) who had cancer of the head and neck and these, 25% were lymphomas (53 cases), 22% rhabdomyosarcoma and other soft tissue sarcomas (25 cases), 16% retinoblastoma (33), 15% brain tumor (32) and 7% carcinoma of the thyroid (15). There was a conc. of cases of retinoblastoma in age 0-2 yr. and of carcinoma of the thyroid in lymphomas among older children; in general, children with head and neck cancer were more commonly boys with the exception of carcinoma of the thyroid.

1220 AIR POLLUTION RESEARCH IN ITALY. (E.) Giovanardi, A. (Inst. Hyg., U. Milan, Italy), E. Grosso and E. De Fraja Frangipane. *C. Roy. Soc. Med.* 57(10)(Pt.2):991-997, 1964.

A study of air pollution in Italy revealed the mortality rate from malignant tumors of the respiratory tract to have increased progressively during 1932-1959 from 2.5 to 16/100,000 population. The male to female ratios (mortality per 100,000) were 3.3:1.3 in 1932, and 27.9:5.5 in 1959. The death rates (per 100,000) were found to be highest in northern industrial regions (26), next highest in southern industrial regions (Rome and Naples) together with northern agricultural regions (13.1-23.2) and lowest in southern agricultural regions (6-10). Areas showing the highest mortality rates from respiratory tract malignancies also showed the highest amount of air pollutants (SO_2 , 3,4-benzene, arsenic). However, no direct correlation could be made between malignant tumors or other diseases of the respiratory tract and air pollution, and further studies employing more sensitive and more suitable procedures are suggested.

1221 FREQUENCY OF MULTIPLE PRIMARY MALIGNANT NEOPLASMS ASSOCIATED WITH COLORECTAL CARCINOMA. (E.) Polk, H. C., Jr. (Dept. Surg., Washington U. Sch. Med., St. Louis, Mo.), J. S. Batt, Jr. and H. R. Butcher, Jr. *Am. J. Surg.* 111(1):71-75, 1965.

A study of 3 groups of pts. (totaling 2,157) with histologically confirmed carcinoma of the colon or rectum revealed that 2-3% of the pts. had multiple colonic carcinoma at the time the colonic cancer was initially detected. Various primary extracolonic malignant neoplasms were detected prior to colorectal carcinoma in 28/856 (3.3%), occurred simultaneously or nonsimultaneously in 21/1141 (10.6%). The data indicated that new

malignant neoplasms of colonic or extracolonic origin would subsequently develop in one-third of pts. which survive their initial colorectal carcinoma.

65-1222 CANCER OF THE BREAST IN ONTARIO. (E.) Sellers, A. H. (Med. Statist. Br., Ontario Dept. Health, Toronto, Canada). *Canad. Med. Assn. J.* 92(1):1-6, 1965.

Cancer of the breast is the most common form of cancer occurring in women living in Ontario and accounted for 20.5% of all female cancer deaths and 3.6% of all female deaths during the period 1957-1961. The age-specific death rate (per 100,000) among females during this 5 yr. period was insignificant under 25 yr. of age, but increased steadily with age: it was approx. 1-6 at 25-30 yr., 6-12 at 30-35 yr., 12-28 at 35-40 yr., 28-48 at 40-45 yr., 48-60 at 45-50 yr., 60-70 at 50-55 yr., 70-85 at 55-60 yr., 85-105 at 60-70 yr., 105-155 at 70-75 yr. and 155-188 at 80-84 yr. Analysis of 4 cohorts of women born around 1871, 1881, 1891 and 1901 yielded indistinguishable mortality patterns. During the yr. 1958-1960, the crude mortality rates (per 100,000) from cancer of the female breast was 37.9 in England and Wales, 33.9 in Denmark, 28.8 in Sweden, 26.2 in Ontario, 25.7 in the U.S., 25.6 in New Zealand, 15.8 in Finland and 3.5 in Japan. The mortality rates in these and other countries have been stable over the past 30 yr. The variations appeared to be related to fertility and to breast feeding. It was concluded that despite emphasis on early diagnosis and improvements in therapy and technology, little or no change has occurred in the breast cancer survival rates.

65-1223 CANCER OF THE ORAL CAVITY IN NEGROES. (E.) Leffall, L. D., Jr. (Dept. Surg., Howard U., Washington, D. C.) and J. E. White. *Surg. Gynec. Obstet.* 120(1):70-72, 1965.

In a 15-yr. survey of oral cancer in a total of 107 Negroes (17-86 yr. old., av. 53 yr.; 72% male), the primary sites in order of decreasing frequency were: the floor of the mouth, tonsil, and tongue; carcinoma of the lip was rarest (2/107 = 1.8%). Squamous cell carcinoma was the most common tumor type. Metastatic cervical adenopathy (usually involving the submaxillary and subdiaphragmatic nodes) was initially present in 63% of pts. Chronic alcoholism, prolonged use of tobacco (usually cigarettes), and poor oral hygiene were prominent associated factors in this pt. series. Among the 7 pts. with buccal mucosa cancer, 4 used chewing tobacco.

65-1224 BASAL CELL EPITHELIOMA. A CONTROLLED STUDY OF ASSOCIATED FACTORS. (E.) Gellin, G. A. (Dept. Derm., New York U. Sch. Med., N. Y.), A. W. Kopf and L. Garfinkel. *Arch. Derm.* (Chicago) 91(1):38-45, 1965.

A total of 861 histologically proven cases of basal cell epithelioma (BCE) were compared with 1938 dermatologic clinic pts. without skin tumors. Based on a comparison with a total clinic population of 53,967 during the same period (between 1955 and 1959; 3.25 yr.), assuming age and sex distribution to be the same as the 1938 controls which were seen between 1958-60, the incidence of BCE was 25% higher in males than in females for the entire group and for the pts. between the ages 40-79 yr. Comparisons between 771 Caucasian BCE pts. and 783 control pts. between 40-79 yr. of age indicated a statistically significant tendency in the BCE group for light hair and eyes, fair complexion, to sunburn easily and to spend more time outdoors. However, less than 6% of the BCE group exhibited all 5 features compared to 0.6% of the controls. Prior skin cancers occurred in 7.4% of the BCE group compared to 0.1% of the controls. No significant difference was noted between the BCE pts. and the controls in regard to the familial incidence of skin cancers.

- 65-1225 RADIATION INJURY TO THE FETUS. (Jap.) Hirai, T. (Dept. Obstet. Gynec., Hiroshima U. Sch. Med., Japan), S. Nakagawa, K. Shirasu and A. Aragi. Sanfujinka Chiryo (Obstet. Gynec. Ther.) 9(4):379-387, 1964.

In a survey of a total of 536 children in Hiroshima who were exposed in utero to the atomic explosion, there were 4 cases with malignant tumors. Intra-uterine age (mo.) at time of exposure was 5 mo. (male), and 5, 7 and 10 mo. in 3 females. The amount of radiation was 4.23-12.7, 0.4-2.4, >100, and 0.4-2.4 rads. Three were exposed at 1,220, 2,100 and 2,800 m from the hypocenter; the other pt. moved into the city for a wk. after the blast. As to type, there were 2 myeloid leukemia, a malignant, mixed, kidney tumor (teratoma + Wilms's tumor), and an adenocarcinoma of the uterus. Their ages at onset of illness were 10, 17, 14, and 17 yr. The authors stated that they had failed to disclose any injury related specifically to exposure to large amounts of radiation.

- 65-1226 THE INCIDENCE OF LEUKEMIA IN HIROSHIMA DURING THE PERIOD 1946-1963. (Jap., Abstract) Watanabe, S. (Dept. Path., Hiroshima U. Sch. Med., Japan), F. Hirose, K. Yokoji and S. Takizawa. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(1):52, 1964.

The period of observation as reported in CRA 2(2):#359, 1964 has been extended through 1963. There occurred 14 cases of leukemia in Hiroshima; 7 of these were exposed to the atomic blast (1 of the 7 was intrauterine at time of the blast). This makes the incidence of leukemia in Hiroshima 2.85/100,000 (7.5/100,000 if only the blast-exposed cases were considered). The incidence of leukemia, however, was declining in recent yr. (See also CRA 2(2):#359, 1964, and ibid., 3(2):#326, 1965.)

- 65-1227 CORRELATION BETWEEN THE BLOOD GROUPS AND THE INCIDENCE OF UTERINE CERVIX AND MAMMARY CANCER. (Pol.) Domaradzka-Woźniak, A. (Inst. Radiol., Acad. Med., Gdansk, Poland). Pol. Tyg. Lek. 19(45):1726-1729, 1964.

In comparison to 12,125 healthy women, an increase in group B and a decrease in group O were found among 352 pts. with mammary cancer, and an increase in Rh⁺ was found among 1465 pts. with uterine cervix cancer. These differences were statistically significant.

- 65-1228 CARCINOMA OF THE OESOPHAGUS. (E.) Whittaker, L. R. (X-Ray Dept., Kenyatta Nat. Hosp., Nairobi, Kenya). E. Afr. Med. J. 41(9):430-435, 1964.

Figures from the Annual Returns of the Ministry of Health from 1955-62 revealed that 332 men and 80 women in Kenya had esophageal carcinoma. Related to population density there was probably a fairly uniform incidence in most parts of the country. It may be significant that no cases were reported from the hospitals at Wajir, Moyale, Garissa, and Galole, serving the region occupied by the Cushitic ethnic group. Between January 1960 and August 1963, the author examined radiologically 115 pts. (no details) with esophageal obstruction or dysphagia in Nairobi. Among 50 with proven esophageal carcinoma, the most frequent site was at the level of the aortic knuckle or tracheal bifurcation.

- 65-1229 CANCER IN ULCERATIVE COLITIS. REPORT OF 27 CONSECUTIVE COLECTOMIES. (E.) Scheeres, J. W. J. Iowa Med. Soc. 54(12):699-702, 1964.

Twenty-seven colectomy specimens from 164 pts. with chronic ulcerative colitis (CUC) revealed 8 cases (4 men, 4 women) of colon cancer, an incidence of 4.9%. An additional cancer case was not included (no colectomy specimen). The incidence of multicentricity in cancer of the colon with CUC is 3x greater and the 5-yr. survival rate is 3x poorer, as compared to "ordinary" colon cancer. The age of onset for colon cancer is 20 yr. earlier in pts. who have had CUC as compared to pts. without a history of colonic disorders. Steroids may mask rampant carcinomatous transformations.

- 65-1230 CANCER OF THE BRONCHUS AND LUNG: CONNECTICUT 1935-1959. (E.) Eisenberg, H. (Chron. Dis. Contr. Sect., Connecticut State Dept. Health, Hartford), J. M. Shames, W. L. Holloway and H. S. Barrett. J. Chronic Dis. 17(11):1033-1054, 1964.

A detailed 22-yr. analysis of bronchial and lung cancer in Connecticut reveals that the age-adjusted

Incidence (per 100,000) in males has risen from 17.7 in 1935 to 46.7 in 1959; corresponding figures for females show a rise from 4.1 to 7.3. The number of cases reported in this period was 1,610 males and 1,285 females.

5-1231 EPIDEMIOLOGICAL AND VITAL STATISTICS REPORT. (E. & Fr.) WHO (Geneve) 17(12):643-736, 1964.

For recent yr. for certain countries and subdivisions statistics on neoplasms are supplied: numbers of registered cases; morbidity rates by sex and age; percentages of cases at each site of total cases by sex and age. Separate sections deal with the German Federal Republic (1960) and Austria (1962).

5-1232 PROBLEMS IN STATISTICS AND OF GEOGRAPHIC DISTRIBUTION IN THE STUDY OF THE PATHOLOGY OF MALIGNANT TUMORS. (Rus.) Merkov, M. Vop. Onkol. 10(9):3-7, 1964.

A discussion of statistical treatment of data on cancer is presented in which the importance of the use of correct methods is stressed. Causes of error and possibilities of improvement are mentioned and a comparison is given of statistical methods employed in Russia and in other countries.

5-1233 CANCER IN NORTH VIETNAM (FROM 1955 TO 1961). (Fr.) Luong, T.-T. and T.-L. Acta Un. Int. Cancr. 20(3):623-625, 1964.

5,492 cases of cancer observed in Vietnam among a total population of 16 million (census of 1960) by the Radiology Institute of Hanoi during the yr. 1955-61, 2,774 (50.51%) occurred in men and 2,718 (49.49%) in women; the av. age was 45 and 43 yr., resp. The cancer distribution (percentage) by site was as follows: uterus 12.52; stomach 11.18; nasopharynx 9.73; breast 8.18; penis 7.77; oral cavity 4.63; skin 3.64; and liver (primary) 2.23. In men, cancers of the penis, stomach and nasopharynx were the most frequent (13.62%, 13.51%, and 12.65%, resp.); in women the highest incidence was for cancer of the uterus, breast, stomach and nasopharynx (22.84%, 16.64%, 6.62% and 4.85%, resp.). Some etiopathogenic factors of significance are discussed: the high incidence (95.4%) of untreated congenital phimosis in cases of penile cancer; the lack of correlation between smoking or betel nut chewing and the high frequency of nasopharyngeal cancer; the presence of ulcerative conditions in the history of 79.5% of the cases with cancer of the stomach; and the role of alimentation and of chronic parasitic infections of the biliary system in cancer of the liver.

5-1234 EXPEDITIONS ORGANIZED FOR THE STUDY OF CANCER EPIDEMIOLOGY IN USSR. (Fr.)

Tchakhline, A. (Cent. Inst. Traum. Orthoped., Moscow), O. Sviatoukhina, L. Orlovski, A. Gvamitchava, B. Kaufman, A. Chapochnikova, R. Tchikovani and Z. Rakhimov. Acta Un. Int. Cancr. 20(3):602-604, 1964.

Since 1955 various expeditions have been organized in the USSR to study cancer epidemiology in certain regions of particular interest. The results show that skin and face tumors are 3-4x more frequent in southern regions than in the Great North and among farmers not protected against the sun than among those protected. Thus, sunlight appears to be a carcinogenic factor. Cancer of the oral cavity was more frequent in those regions where the sublingual use of "nass" (a mixture of tobacco, wood ashes, lime and oil) was prevalent; of 7,000 "nass" users examined, all presented pathological changes of the buccal mucosa. Esophageal cancer was relatively more frequent in regions where people drank very hot tea. Mammary cancer incidence was lowest in Tadjikistan and Uzbek, probably in relation to the way of life of the people; women start their sexual life very early, have several pregnancies with prolonged and numerous periods of lactation, with infrequent interruption of pregnancies.

65-1235 CANCERS OF THE STOMACH AFTER GASTRECTOMY FOR ULCER. (Fr.) Chalmot, P. (Surg. Clin. A, U. Nancy Sch. Med., France), J. Grosdidier and M. Bessot. Ann. Med. Nancy 3:320-331, 1964.

Of 500 pts. with gastric neoplasms who underwent surgery at the authors' clinic between 1948 and 1961, 10 (9 male; 1 female) developed cancer at the gastric stump after gastrectomy for a histologically confirmed benign ulcer. The age at time of cancer appearance was 45-78 yr. The authors review (31 references) and discuss similar cases from the literature.

65-1236 CANCER ILLNESS IN FINLAND, WITH A NOTE ON THE EFFECTS OF AGE ADJUSTMENT AND EARLY DIAGNOSIS. (E.) Saxén, E. and M. Hakama. Ann. Med. Exp. Fenn. 42(Suppl. 2):1-28, 1964.

Of 9,932 new cancer cases diagnosed during the yr. 1959 in Finland and reported by the Finnish Cancer Registry, 5,043 were seen in males and 4,889 in females, comprising a crude incidence rate/100,000 population of 237 and 213, resp. In males, the highest incidence rates were seen for cancer of the bronchus and lung (60.2), stomach (49.6), skin (21.2) and prostate (15.2). In females, highest incidence rates were seen for cancer of the stomach (37.9), uterus (31.2), breast (29.3) and skin (24.1). Charts showing age-specific incidence rates for the most frequent cancer sites are presented, and difficulties in the comparison of age-adjusted data are discussed. Cancer of the respiratory system, breast and genitals showed higher incidences in urban areas; cancer of the buccal cavity and pharynx showed a higher incidence

in rural areas. No correlation was observed between lung cancer and month of birth. The age distribution of localized and non-localized tumors was also investigated. The trends in cancer incidence as shown by studies over a 7-year period (1953-59) show a decrease in stomach cancer for both sexes and an increase for leukemia and cancer of the lung, skin and prostate.

- 65-1237 INCIDENCE OF CARCINOMA OF THE STOMACH AMONG PEOPLE LIVING IN KYOTO PREFECTURE, JAPAN. (Jap., Abstract) Wakisaka, K. (Dept. Intern. Med., Kyoto U. Sch. Med., Japan), S. Miyoshi, K. Nagata, S. Nishi, Y. Kanematsu, K. Ochi, K. Tomie and M. Sato. Gan No Rinsho (Jap. J. Cancer Clin.) 10(4):275-276, 1964.

Among people above age 40 who lived in Kyoto prefecture, the number of deaths due to carcinoma of the stomach (per 100,000) was 57 in males, 38 in females; these rates were slightly higher than for the general population of Japan. Among 2,359 people above age 40 who lived in 9 towns (5% of all people above age 40 in the areas) who received a screening test for carcinoma of the stomach in 1963-1964, 30-40% showed a family history of carcinoma of the stomach, as compared with 45% in people living in the city of Kyoto. Stomach carcinoma was found in 26/2,359. Incidence of stomach carcinoma in certain towns (Hyuga-machi, Nodagawa-cho, Yaei-cho, and Tango-cho) was higher than that in other towns but no particular explanation for this difference was presented. In young adults and middle-aged people in this prefecture, av. death rate due to carcinoma of the stomach was higher than the av. death rate due to cerebrovascular accidents.

- 65-1238 STUDIES AND CONSIDERATIONS ON CANCER MORTALITY IN A LARGE URBAN CENTER. (It.) Granata, A. (Inst. Occupat. Med., U. Messina, Italy) and N. Castriciano. Minerva Med. Siciliana 9(3):78-86, 1964.

In the urban zone of the city of Messina (Sicily), 894 persons (452 males (M), 442 females (F)) died from cancer during the period 1958-62. The av. cancer mortality/1000 people ranged from a max. of 0.96 in 1958 to a minimum of 0.8 in 1960, the av. over the 5 yr. being 0.89. While in 1958 cancer mortality was higher in M than F (101:84 cases), this trend gradually reversed over the following yr., and in 1961 and 1962 more F died from cancer than M (96:98 and 93:87 cases, resp.). The distribution of cancer mortality by site for the 5-year period was: respiratory system 14.87% (115 M and 18 F); uterus and ovary 13.08%; stomach 12.86% (72 M and 43 F); liver 9.84% (37 M and 51 F); intestine 8.05% (33 M and 39 F); breast 7.38%; oral cavity, pharynx and esophagus 2.68% (18 M and 6 F). An analysis of cancer mortality distribution according to occupation showed the frequency to be higher among inactive than active people and among professional people than among field or industrial workers and artisans.

- 65-1239 ABO BLOOD GROUP DISTRIBUTION AMONG PATIENTS WITH LARYNGEAL CARCINOMA. (It.) Celestino, D. (Inst. Clin. Otorinolaryng., U. Rome) and C. Silvagni. Valsalva 40(4):211-216, 1964.

Among 439 male pts. with cancer of the larynx seen at the E.N.T. clinic during the period 1959-62, the percentage distribution of blood groups O, A, B, and AB was 47.83, 37.12, 11.16 and 1.59, resp. Comparable values observed in a control group of 20,051 subjects were 44.71, 40.04, 11.43 and 3.8, resp. The difference observed in the AB groups is significant.

- 65-1240 EPIDEMIOLOGIC ASPECTS OF LEUKEMIA. REVIEW AND APPRAISAL OF NORTH CAROLINA FINDINGS. (E.) Herbert, C. W. (Dept. Med., Bowman Gray Sch. Med., Winston-Salem, N. C.) and D. M. Hayes. N. Carolina Med. J. 25(11):455-462, 1964.

After reviewing the literature (50 references) concerning the epidemiology of leukemia and including incidence, age, sex, seasonal and geographical distribution, leukemogenic agents and relation to blood groups, the authors discuss the pitfalls of classification, diagnosis and reporting. Data collected from 292 cases of acute leukemia seen at the North Carolina Baptist Hospital between 1940-60 showed the number of leukemia cases expected (based on 50% male, 50% female) and observed to be, resp., 146 and 174 for males and 146 and 118 for females. When based on male:female ratio admitted, the number of cases expected and observed was 128.19 and 174, resp., for males and 163.81 and 118, resp., for females. The frequency of leukemia (expected and observed) by Rh blood type was 245.2 and 237 for positive and 46.8 and 55, resp., for negative. The frequency of leukemia by ABO blood type, was: A, 120.68 and 145; O, 129.36 and 111; B, 30.22 and 21; AB, 11.74 and 15, resp. No significant geographic variations were observed.

- 65-1241 EPIDEMIOLOGICAL AND VITAL STATISTICS REPORT. (E. & Fr.) WHO (Geneve) 18(1): 1-56, 1965.

Two tables include for certain countries and population groups the number of deaths and deaths per 100,000 of population due to all malignant neoplasms for the yr. 1961, 1962 and 1963.

- 65-1242 CANINE BONE NEOPLASMS. (E.) Brodey, R. S. (Dept. Surg., U. Pennsylvania Sch. Vet. Med., Philadelphia), R. M. Sauer and W. Medway. J. Am. Vet. Med. Assn. 143(5):471-495, 1963.

In a survey (1952-62) at the University of Pennsylvania Veterinary Hospital, of 152 dogs with bone sarcomas, the distribution of tumor types was as follows: osteosarcoma (OS) 130; chondrosarcoma

) 12; hemangiosarcoma 4; fibrosarcoma 3; 1 each lymphosarcoma, reticulum cell sarcoma and liposarcoma. Of the OS, 69 occurred in males and 53 females (8 sex unknown); the age range was 5 yr. (av. 7.3 yr.); the breeds most frequently involved were Boxer (32), Great Dane (22), St. Bernard (10) and Irish Setter (9); the most common sites of origin were radius, tibia, humerus and scapula. Of the CS, 6 were seen in males and 5 in females; the age range was 1-10 yr. (av. 5.7 yr.); the most frequently affected breeds were Boxer (3) and Dalmatian (3); all originated from flat chondrosarcomas. The relatively common occurrence of OS in dogs and its similarity to OS in humans make this disease in the dog worthy of much more detailed investigation. (See also CRA 1(11):#1861, 1964.)

1243 QUESTION AND ANSWER. CARCINOGENIC EFFECTS OF CONTRACEPTIVE PILLS. (Dut.) Perl, T. Geneesk. 108(22):1087-1088, 1964.

Cancer specialist reports no evidence to date of increased frequency of cervical carcinoma in connection with the use of contraceptive pills. Gynecologist reviews the theoretical bases of possible carcinogenic effects in terms of mammary and ovarian carcinoma and carcinoma of the corpus uteri. Both specialists agree that a prolonged period of further use (possibly up to 20 yr.) will be required before a definitive answer can be given with respect to the late, possibly carcinogenic effects. Both recommend periodic interruption of use in order to minimize the possible carcinogenic effects of prolonged disturbance of endocrine function.

1244 SMOKING, LUNG CANCER AND COMPETITION OF FATALITY RATES. (Dut.) Oppers, M. (Bur. Statist., Amsterdam, Netherlands). Perl, T. Geneesk. 108(33):1574-1580, 1964.

A statistical review (19 references) and discussion, the author points out that the mortality rate for deaths due to all causes other than lung cancer is considerably lower in all age groups among males of working age than it is in comparable age groups of non-smoking males; this automatically increasing the apparent percentage of deaths due to lung cancer in the smoking group. Similar "competitions of fatality rates" appear to be involved in reports to the effect that smoking involves increased risk of susceptibility to a number of other potentially fatal disorders. The author emphasizes the fact that these conclusions do not pretend to establish the absence of a causal relationship between smoking and either lung cancer or the other to explain the factual observations reported to date with respect to smoking in relation to diseases with an apparent excess mortality rate among smokers.

65-1245 SMOKING HABITS AND HEALTH IN MARYLAND AND NEIGHBORING STATES. (E.) Hammond, E. C. (Am. Cancer Soc., Inc., 219 E. 42nd St., New York, N. Y.). Maryland Med. J. 13(11):45-50, 1964.

In a statistical study conducted by the Maryland Division of the American Cancer Society up to September 30, 1962 in a total of 63,834 men in the age group 40-89 from Maryland, Virginia and Pennsylvania, lung cancer was found to account for the death of 118 (103 aged 40-69 yr.; 15 aged 70-89 yr.). Of these, 112 had a history of regular cigarette smoking, 3 smoked only pipes or cigars and 3 were nonsmokers. The lung cancer death rate was 17x as high among men with a history of cigarette smoking as among men who never smoked, and increased greatly among cigarette smokers with the amount of smoking. Cancer of the buccal cavity, pharynx, larynx, esophagus and bladder accounted for 40 deaths. Of these, 27 smoked only cigarettes, 5 smoked only pipes or cigars and 2 were nonsmokers. For related studies for Iowa, see CRA 3(3):#592 and for Pennsylvania, *ibid.*, #598, 1965.

65-1246 VITAL STATISTICS OF THE UNITED STATES 1963. Vol. II - Mortality, Part 2.

U.S. Dept. Health, Education, Welfare, Washington, D. C., 1965, 573 pp.

Relative to mortality data for 1963, malignant neoplasms (total and by site) are included in tables which show deaths according to race, sex, age groups and for each state and certain rural and metropolitan areas in the U.S. A separate section deals with deaths from neoplasms by age and sex for Puerto Rico and by age, color and sex for the Virgin Islands.

65-1247 ABO BLOOD GROUPS AND CANCER OF THE ESOPHAGUS. (Sp.) Maur, M.

(Dr. Bonorino Udaondo Gastroent. Hosp., Buenos Aires, Argentina), J. C. Toranzo and J. Caffarello. Sem. Med. (B. Air.) 124(3):253-254, 1964.

A study of 213 pts. with cancer of the esophagus showed that the distribution of ABO blood groups did not differ significantly from that of the general population.

65-1248 ALEUKEMIC FORM OF CHRONIC LYMPHATIC LEUKEMIA IN A PAIR OF HOMOZYGOUS TWINS.

(Rus., Abstract) Osipov, P. N. (Dept. Therapeut. Republic. Hosp., Chuvash Armenian SSR, Cheboksary) and N. A. Birg. Probl. Gemat. 10(2):62, 1965.

MISCELLANEOUS

- 65-1249 CO-EXISTENT PHEOCHROMOCYTOMA AND THYROID CARCINOMA (SIPPLE'S SYNDROME). (E.) Zak, F. G. (Flower and Fifth Ave. Hosp., New York, N. Y.) and R. H. Kaye. J. Mount Sinai Hosp. N. Y. 31(6):476-486, 1964.

Two case histories are reported of pts. with coexistent pheochromocytoma and thyroid carcinoma; a follow-up on a previously published case is also given. In 20,000 consecutive autopsies 33 thyroid carcinomas and 16 pheochromocytomas were found; in only 1 pt. were they seen together. This occurrence appears to follow an heredofamilial pattern and may be related to other familial, multiple endocrine adenomas.

- 65-1250 LOW BLOOD PRESSURE AND CANCER. (E.) Pellanda, E. B. (Sao Pedro Hosp., Porto Alegre, Brazil). Folha Med. 48(5):243-261, 1964.

Anamnesis of 315 pts. of both sexes with various malignancies showed relatively low blood pressure as compared with normal av. from the literature. There seems to be some evidence that hypertensive individuals are relatively resistant to neoplastic processes. Hormonal predisposition for cancer, particularly when there is a shortage of mineralocorticoids in relation to other hormones, was discussed and reviewed (42 references). A psychoendocrine relationship to cancer was mentioned.

- 65-1251 THE EFFECT OF HYALURONIC ACID ON THE METASTATIC DISSEMINATION OF EXPERIMENTAL TUMORS. (It.) Giordano, G. G. (Fondazione Pascale Tumor Inst., Naples, Italy), V. Verga and L. Giarelli. Boll. Soc. Ital. Biol. Sper. 40(8):383-387, 1964.

In adult male rabbits (3-4 kg wt.) inoc. with Brown-Pearce carcinoma the addition to the tumor transplant of 2.5 mg of hyaluronic acid had no significant effect on mortality from tumor, growth of primary and metastatic tumors, and frequency and distribution of metastases.

- 65-1252 PROLIFERATION AND MATURATION DEFECT IN ACUTE LEUKAEMIA CELLS. (E.) Gavosto, F. (Med. Clin., U. Turin Sch. Med., Italy), A. Pileri, C. Bachi and L. Pegoraro. Nature (London) 203:92-94, 1964.

In vitro studies were carried out by a previously published technic on the cells of pts. with various types of leukemia. It was concluded that there is only one major functional cell defect in leukemia, i.e., an absolute incapacity for differentiation and maturation. As the cells grow older without maturing, they gradually lose their proliferative capacity. The existence of this defect in acute leukemia cells or its development

during the blastic crisis in chronic cases probably indicates the occurrence of new lines of blast cells which have lost nuclear control over differentiation, so that the genetic information governing the synthesis of specific proteins is lost, inhibited, or suppressed.

- 65-1253 THE PROBLEM OF THE MALIGNANT TRANSFORMATION OF GASTRIC ULCER. (Sp.) Penarroja Rabaza, J. (1st. Dept. Path., U. Valencia Sch. Med., Spain), A. Pascual-Leone and R. Bataller Sifre. Rev. Esp. Enferm. Apar. Dig. 23(7):844-859, 1964.

A case is described of a 36-year-old woman with gastric ulcer which underwent adenocarcinomatous transformation 4 yr. after diagnosis. The ulcer was localized in the vertical portion of the lesser curvature of the stomach.

- 65-1254 SPONTANEOUS REMISSION IN THE COURSE OF A CANCER. (Fr.) Almaviva, S. Sem. Ther. 40(5):344-345, 1964.

Described is a case of a 51-year-old woman with a histologically confirmed carcinoma of the stomach which was found to be too extended for surgery. Following the exploratory laparotomy the pt. began to improve and was still living 8 yr. later.

- 65-1255 THE RELATION BETWEEN HODGKIN'S DISEASE WITH EARLY SUPERFICIAL LYMPH NODE INVOLVEMENT AND PULMONARY TUBERCULOSIS. OBSERVATIONS ON A CASE. (It.) Sidari, A. (E. Morelli Municip. Sanitorium, Nat. Inst. Prev. Med., Sondalo, Italy). Ann. Med. Sondalo 12(2):104-121, 1964.

A case is described of a 48-year-old man with Hodgkin's disease which developed 6 yr. after pulmonary tuberculosis. In view of the complexity of the etiologic factors involved in the development of malignant lymphogranuloma, the author suggests that pulmonary tuberculosis may have represented in this case an acquired predisposing factor.

- 65-1256 RELATIONSHIP OF CANCER AND TUBERCULOSIS. (Jap.) Mizukami, T. (Tubercul. Res. Inst., Kanazawa U., Japan) and K. Murasawa. Rinsho To Kenkyu (Jap. J. Clin. Exp. Med.) 41(3):427-434, 1964.

Among 434 autopsy cases in the past four years, cases showed coexistence of tuberculosis of the lung or other organs and malignancies (cancers, sarcomas or leukemia); only 4/25 showed active tuberculosis. Tuberculosis alone was seen in 35/273 showed only malignant tumors. With extensive

search of pathological change of the thyroid and the spleen of these autopsied cases, authors confirmed that there was a definite relationship between hypoergic changes in the thyroid gland or the spleen as well as the lowered activity of the RES and the development of malignancy.

1257 ANTIGENIC STRUCTURE OF HUMAN TUMORS.
4. FRACTIONATION OF THE HUMAN GASTRIC CANCER EXTRACTS BY THE METHOD OF PREPARATIVE ELECTROPHORESIS. (Rus.) Tsvetkov, V. S. (Dept. Immun. Oncol., N. F. Gamaleya Inst. Epidemiol. Microbiol., Moscow), Z. A. Avenirova and L. A. Logovskaia. Vop. Onkol. 10(10):65-67, 1964.

antigenic fraction was isolated from the gastric cancer tissue by electrophoresis in sucrose density gradient. This fraction gave 2-3 lines of precipitation in immunoelectrophoresis, as well as the precipitation reaction in the agar with diluted anticancerous serum. However, no reaction was observed with sera against the normal organs.

1258 SILICOSIS AND LUNG CANCER IN HOKKAIDO.
III. HISTOLOGICAL CHANGES IN THE BRONCHIAL MUCOSA IN SILICOSIS WITH SPECIAL REFERENCE TO METAPLASIA AND PROLIFERATION OF THE GLANDS. (Jap.) Kikuchi, K. (Dept. Cancer Pathology, Hokkaido U. Sch. Med., Japan) and T. Kodama. Nippon Kyobu Rinsho (Jap. J. Chest Dis.) 23(9):620-628, 1964.

Comparative histopathological studies of 31 autopsied cases of silicosis and 31 non-silicosis cases, the authors frequently observed the presence of metaplasia and atypical proliferation of bronchial epithelium in silicosis cases. These changes, however, were observed in connection with chronic bronchial inflammation or pulmonary tuberculosis which accompanied silicosis, rather than in direct connection with silicotic nodules. The mucous epithelium in contact with silicotic scar tissue was generally atrophic. There was atypical proliferation of the basal cells in that silicotic scar tissue which accompanied a destructive area induced by pigments (pigmentdurchbrücke). As regards silicosis, the authors suggest that carcinomas may arise secondarily from the accompanying bronchial inflammatory or tuberculous lesions or directly in silicotic scar tissue.

1259 VAGOTOMY AND CARCINOMA OF THE STOMACH.
(E.) Capper, W. M. and H. D. Johnson. Gut 2:1063-1064, 1964.

pts. (a 26-year-old woman and a 55-year-old man with histories of duodenal ulceration of 10 and 20 yr. duration, resp., manifested a rapid onset of gastric carcinoma after vagal resection.

65-1260 SPONTANEOUS TUMORS ARISING IN PURE C57BL/6J STRAIN MICE MAINTAINED FOR A LONG TIME IN THE LABORATORY. (Jap., Abstract) Kajiki, S. (Dept. Path., Nara Coll. Med., Japan), K. Kimura and Y. Tsubura. Nara Igaku Zasshi (J. Nara Prefect. Med. Assn.) 15(2-3):229-230, 1964.

A survey (1959-1964) of spontaneous tumor incidence among various strains of mice maintained in the authors' laboratory showed in ddj strain an incidence of 39% for mammary carcinoma (females). With ddo strain, 52% of the females developed mammary carcinomas; no males developed tumors. The incidence of mammary carcinoma increased with age. In (AKR-ddo)F1 strain, leukemia was seen to develop frequently, while in (ddo-AKR)F1 strain, mammary carcinoma had a high incidence. In the latter two strains, fibroma, papilloma and hepatoma developed occasionally among the aged. In C57BL strain, no tumors developed spontaneously. When C57BL was crossed with ddj, however, leukemia and mammary carcinoma developed among the offspring, particularly in the aged. In A strain, mammary carcinoma and lung adenoma developed frequently; leukemia developed occasionally among the young; hepatoma and s.c. sarcoma developed occasionally among the aged.

65-1261 RELATIONSHIP BETWEEN SJÖGREN'S SYNDROME AND CANCER. (Pol.) Gruszka, S. (2nd Clin. Intern. Dis., Acad. Med., Wrocław, Poland) and W. Zukowski. Pol. Tyg. Lek. 19(45):1738-1739, 1964.

A 29-year-old woman with scleroderma and a history of Sjögren's syndrome of 7 yr. duration developed cancer of uterine cervix. Changes in tissue absorption of minerals and vitamins leading to enzyme disturbances affecting the oxidation-reduction reactions of metabolism may be responsible for the high frequency of cancer in cases with the Sjögren's syndrome.

65-1262 INTRINSIC FACTOR SECRETION IN CANCER OF THE STOMACH. (Fr.) Nabet, P. (Dept. Biol. Chem., U. Nancy Sch. Med., France), R. Wolff and F. Besançon. Arch. Mal. Appar. Dig. 53(6):679-686, 1964.

Among 11 pts. with cancer of the stomach the secretion of the intrinsic factor was normal only in one. It was completely abolished in 2/11 and decreased by 30%-97% in 8/11. Due to the small number of cases examined and controversial data from the literature (20 references) the authors believe that no significant conclusions can be drawn as to a correlation between intrinsic factor deficiency and gastric cancer.

65-1263 BREAST CANCER IN THE POSTMENOPAUSAL YEARS. (E.) Tellem, M. (Dept. Path., Hahnemann Coll. Med., Philadelphia, Pa.),

J. J. Shane and J. E. Imbriglia. Surg. Gynec. Obstet. 120(1):17-24, 1965.

A study of 90 postmenopausal pts. 60-97 yr. of age with breast cancer showed the occurrence in 35% of orderly and atypical lobular and ductal hyperplasia which arose adjacent to the cancer or in other sites of the breast with equal frequency. Such findings in this age group, where atrophy is normally expected, are believed to support the concepts that both benign and malignant proliferative epithelial processes are influenced by common environmental factors, and that breast cancer passes through various benign and atypical proliferative stages before becoming in situ, and finally, invasive carcinoma.

65-1264 SIALIC ACID AND THE ELECTROPHORETIC MOBILITY OF THREE TUMOR CELL TYPES.

(E.) Wallach, D. F. H. (Dept. Biol. Chem., Harvard Sch. Med., Boston, Mass.) and M. V. De Perez Esandi. Biochim. Biophys. Acta 83(3): 363-366, 1964.

When the total sialic acid (SA) content and the electrophoretic (E) mobility of cells from Ehrlich ascites carcinoma, solid sarcoma MCIMSS and ascites sarcoma MCIMAA (derived from MCIMSS) were determined after enzyme treatment with partly purified Vibrio cholerae sialidase, no obvious correlation between the 2 was seen. The graded removal of SA on the E mobilities of the 3 tumors produced the following results: with MCIMSS, the SA release did not produce any change in E mobility; the mobility of MCIMAA was sharply reduced by removal of SA only up to about 0.1 μ mole/ml of cells; all the SA residues contributed equally to the electrokinetic potential in Ehrlich ascites cells.

65-1265 GROUP-C TRISOMY IN MYELOID METAPLASIA WITH POSSIBLE LEUKEMIA. (E.)

Sandberg, A. A. (Roswell Park Mem. Inst., Buffalo, N. Y.), T. Ishihara and L. H. Crosswhite. Blood 24(6):716-725, 1964.

Myeloid metaplasia and possible acute leukemia was diagnosed at autopsy in a 69-year-old diabetic woman who had received therapeutic X-irradiation 20 and 55 mo. previously for a basal cell carcinoma. Marrow and blood studies revealed no Ph₁ chromosome, although the clinical picture was that of chronic myeloid leukemia. However, most marrow and blood was hyperdiploid, with a sharp mode at 47, the extra chromosome being a trisomic C-9, as has been found in some acute leukemia pts. There were also a number of hyper-tetraploids with the same trisomy in bone marrow, but not in blood.

65-1266 STUDY OF ANTIGENIC PROPERTIES OF MELANOMA OF MAN AND MOUSE WITH THE AID OF ANAPHYLAXIS REACTION WITH DESENSITIZATION. (Rus.)

Rosenbaum, G. I. (P. A. Herzen Nat. Inst. Oncol., Moscow). Vop. Onkol. 10(10):67-71, 1964.

In the human melanoma tissue and its metastases, in addition to common antigens, an antigen was found which is absent in normal organs of man. In Harding-Passey melanoma (transplanted in C57BL mice) an antigen was found which was not detected in the normal mouse organs. In cross anaphylactic reactions with desensitization an immunological relation between melanoma antigens of man and mouse was noted.

65-1267 THE BEHAVIOUR OF HUMAN SPERM TOWARD CULTURED FRAGMENTS OF HUMAN CERVIX UTERI.

(E.) Reid, B. L. (Queen Elizabeth II Res. Inst. Mothers-Infants, Sydney, Australia). Lancet 1:21-23, 1964.

In a study of short-term tissue cultures of biopsy material from the postparturient cervix to which fresh human semen was added, about 3% of the specimens showed penetration of sperm between adjacent epithelial cells. Squamous epithelium was never seen to be penetrated while 75% of specimens showed penetration of sperm into sites throughout the epithelium. In histological preparations of the non-cultured postparturient cervix large sub-epithelial collections of plasma-cells producing gamma-globulin are found beneath the epithelium during the process of metaphasia at precisely those histological stages where sperm penetrates. The significance of these findings in connection with subsequent growth and possible development of subsequent cancer is discussed.

65-1268 THE OBSERVATION IN MADAGASCAR OF ADENOCARCINOMA AND BRONZE CIRRHOSIS IN A LEMUR M. MACACO L.1766. (Fr.)

Brygoo, E.-R. (Dept. Histopath., Inst. Pasteur, Madagascar), J. Levaditi, P. Destombes and J. C. Guillon. Bull. Soc. Path. Exot. 57(2):228-233, 1964.

The autopsy of a female lemur which had lived in captivity for 4 yr. revealed the presence of hepatoma associated with pigmentary cirrhosis. The tumor had metastasized to the lungs. Hemochromatosis was also present. This is believed to be the first case of hepatoma reported in a lemur. Nutritional factors are suggested to have played a role in the pathogenesis of this condition.

65-1269 NEOPLASMS IN THE ECTOPIC TESTICLE.

(Sp.) Molina, J. J. and R. A. Olmedo. Acta Med. Cordoba 9(1-2):39-40, 1964.

Of 19 cases of testicular neoplasms seen during a period of 8 yr., 3 occurred in pts. (age 30-40 yr.) with abdominal testicles and 2 in pts. (age 18 and 27 yr.) with originally ectopic testicles which had returned to normal position following medical treatment in one and surgery in the other. In the latter two pts. the time lapse between the

scient and the discovery of cancer was of 4 and yr., resp. The most frequent tumor type was minoma.

65-1270 THE APPEARANCE OF A COMMON SCHWANNOMA AT THE SITE OF A CELLULAR NEVUS INCOMPLETELY REMOVED BY SURGERY. (Fr.) Vandaele, R. *Ch. Belg. Med. Syph.* 19(4):295-297, 1964.

6 mo. after the superficial shaving of a pigmented nevus on the neck, the formation of a pigmented spot was again observed on the surgical scar of a 15-year-old girl. Microscopic examination revealed the regeneration of the pigmented nevus on the surface and the formation of a schwannoma lying above the remnants of the nevus. The significance of the formation of a schwannoma between the superficial nevus and the preserved dermic portion of the original nevus is discussed.

65-1271 REMARKS ON THE STUDY OF K. E. HAMPEL: DIPLO-Ph¹ CHROMOSOME IN MYELOID LEUKEMIA. (Ger.) Gropp, A. (Inst. Path., U. Bonn, Germany). *Klin. Wschr.* 42(20):1032-1033, 1964.

In the author's opinion K. E. Hampel's study (see A 3(1):#178, 1965) gives the impression that the endoreduplication (E) of blood cells grown *in vitro* is a peculiarity of myeloid leukemia. However, this is not the case. Such E (0-10%) could be found in short term cultures of peripheral blood cells regardless of any specific disease form. A pathologic chromosome then appears indicated in E.

65-1272 ENDOREDUPPLICATION IN LEUCOCYTE CHROMOSOMES. PRELIMINARY REPORT OF ITS REACTION TO CANCER AND WHOLE-BODY IRRADIATION. (E.) Friedman, B. I. (Radioisotope Lab., Cincinnati Coll. Med., Ohio), E. L. Saenger and M. S. Kreindler. *Lancet* 2:494-495, 1964.

Endoreduplication (E) was present in 11/11 pts. with disseminated cancer (8 carcinomas, 1 Hodgkin's disease, 1 Ewing's sarcoma, 1 malignant melanoma; 4/11 had had no previous irradiation nor chemotherapy). E was not found in 4/5 selected controls; 2 endoreduplicated cells were seen in the fifth control. An increased frequency of E after total-body irradiation was documented.

65-1273 PH CHROMOSOME AND 5-12 TRANSLOCATION IN A CASE OF CHRONIC MYELOID LEUKEMIA. (Sp.) Sánchez Cascos, A. (Dept. Genet., Jiménez Foundation, Madrid, Spain) and E. Barreiro. *Clin. Esp.* 94(1):10-13, 1964.

In a woman with chronic myeloid leukemia, cultures of peripheral blood leukocytes revealed the presence of 2 chromosome aberrations: deletion of chromosome 21 and 5-12 translocation, the

latter with the formation of a T chromosome. These chromosome abnormalities were not found in the pt's. 2 brothers nor in her 8 children. The presence of the T chromosome was probably related to the pt's. condition and the intensive therapy she had undergone.

65-1274 EFFECT OF EARLY THYMECTOMY ON DEVELOPMENT OF MAMMARY TUMOURS IN MICE. (E.) Martinez, C. (Dept. Physiol., U. Minnesota Sch. Med., Minneapolis). *Nature (London)* 203:1188, 1964.

Spontaneous mammary tumors developed in 94.5% of controls and in 57.6% of female C3H/Bi mice thymectomized at the age of 6 days. The mean cancer age was later in the thymectomized group (335 days compared to 276 days in intact mice).

65-1275 SIGNIFICANCE OF CHROMOSOMAL INVESTIGATION OF SOMATIC CELLS TO DETERMINE THE GENETIC ORIGIN OF GONADOBLASTOMA. (GONOCYTOMA III). (E.) Philip, J. (Dept. Obstet. Gynec., Rigshospitalet, Copenhagen, Denmark) and J. Teter. *Acta Path. Microbiol. Scand.* 61(4):543-550, 1964.

A review (15 references) and discussion are presented on the heightened tumor risk in abnormal gonads, and particularly of the gonadoblastoma developing in dysgenetic gonads. Leukocytes from peripheral blood and/or cells from skin of 5 cases of male pseudohermaphroditism and gonadoblastoma revealed the presence of the Y-chromosome. This presence of the Y-chromosome somewhere in the somatic tissues constitutes important evidence that gonadoblastoma is of testicular origin (suggesting that gonadal anlage should have developed into a testis).

65-1276 NASOPHARYNGEAL CARCINOMA. UNUSUAL CASE REPORTS. (E.) Jaffee, I. S. (915 19th St., NW, Washington, D. C.). *Arch. Otolaryng.* 80(4):450-453, 1964.

Case histories are presented of metastatic nasopharyngeal carcinoma (NC) in 2 adolescent Negro siblings, with the presence of pulmonary hypertrophic osteoarthropathy (HO) in a girl aged 19.5 yr. and clubbing of the fingers (prehypertrophic osteoarthropathy) in a boy aged 12 yr. A review (8 references) of 3 other cases shows that in all of the 5 cases, the rare association of HO with NC, with or without pulmonary metastases, occurred in pts. who were all adolescents. This fact leads to an assumption that hormonal factors must be associated.

65-1277 THE MALIGNANT TRANSFORMATION OF A GIANT BASAL CELL NEVUS. (Fr.) Rimbaud, P. (Dept. Derm., U. Montpellier, France), A. Pagès and M. Lisbonne. *Bull. Soc. Franc. Derm. Syph.* 71(3):313-316, 1964.

A case is described of a woman with basal cell nevi on the leg and foot which developed progressively with a nodular aspect since the age of 16 and began to ulcerate at the age of 68, thereafter extending and metastasizing. At surgery at age 70 complete epitheliomatous transformation was noted.

- 65-1278 CHROMOSOME ABNORMALITY IN A PATIENT WITH SUBACUTE ERYTHROLEUKEMIA. (Jap.) Osamura, S. (Dept. Intern. Med., Tokyo Coll. Med., Japan), M. Kawanishi and M. Adachi. Igaku To Seibutsugaku (Med. Biol., Tokyo) 69(3): 109-113, 1964.

Chromosome abnormalities in a 60-year-old male with subacute erythroleukemia are reported. Bone marrow cells had 40-45 chromosomes (the mode is 44) in addition to polyploid cells and chromosome fragments, while leukocytes had normal chromosomes (mode 46). The majority of the missing chromosomes of the bone marrow cells were in groups C and E, but some were in groups D and G (Tolliver's classification). It is the authors' opinion that this erythroleukemia had stem cells with 44 chromosomes, which in turn were responsible for the malignant proliferative process of the disease.

- 65-1279 CHROMOSOME ABNORMALITIES OBSERVED IN TWO CASES OF ERYTHROLEUKEMIA. (Jap., Abstract) Adachi, M. (Dept. Intern. Med., Tokyo Coll. Med., Japan), C. Ito, M. Kawanishi, T. Yamamoto, H. Katsunuma and S. Osamura. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(2-3):264, 1964.

One of the cases reported here has already been reported (see preceding abstract). In another case of erythroleukemia the mode of the chromosome numbers of the bone marrow specimen was 47, while that of the circulating blood was 46. The additional chromosomes in the bone marrow tissue were seen in group C and partly in group G. The karyotype of the peripheral blood was normal.

- 65-1280 THE ASSOCIATION OF LYMPHOID LEUKEMIA WITH EPITHELIAL CANCER. (Fr.) Bousser, J. (Dept. Hemat., Hotel-Dieu, Paris), R. Zittoun, D. Simony and G. Schaison. Sem. Hop. Paris 40(50):2721-2728, 1964.

Described are 17 pts. (12 men and 5 women) who developed lymphoid leukemia at the age of 50-74 yr. and also had epithelial cancer. Leukemia preceded cancer in 9/17, developed after cancer in 5/17 and was discovered at the same time in 3/17.

- 65-1281 SOME OBSERVATIONS IN TUMOR IMMUNITY IN RELATION TO THE PROPERDIN SYSTEM. (Fr.) Nagy, I. S. (Municipal Policlin. Budapest, Hungary),

M. Ats, M. Koszoru and I. Lust. Sangre (Barc.) 9(2):272-274, 1964.

In rabbits inoc. i.v. or intratesticularly with saline suspension of Brown-Pearce carcinoma, treatment with multiple inj. of the antitumor polysaccharide Mannozyne prior to tumor inoc. and continuing until the animal's death, reversed the decrease of serum properdin (SP) which was observed simultaneously with tumor growth in untreated animals. In treated rabbits which did not develop tumors there was a transient drop in SP; in treated rabbits with tumors SP was decreased as in controls but the fall was slower. Offspring of cured rabbits were resistant to a first tumor inoc. but developed tumors upon a second inoc. 30 days later; however, they survived 35-60 days longer than controls. When treatment was delayed until after i.v. inoc. of tumor, metastatic dissemination was more rapid than in untreated rabbits.

- 65-1282 A FURTHER CONTRIBUTION ON THE ASSOCIATION OF CARCINOMA OF THE UTERINE BODY AND DIABETES MELLITUS. (It.) De Marini, M. (Dept. Obstet. Gynec., Civil Hosp., Genoa, Italy) and S. Alessandri. Riv. Ostet. Ginec. Prat. 45(6):489-542, 1963.

Analysis of all cases (732) of female genital carcinomas observed from 1952-61 in the Department of Obstetrics and Gynecology showed that the association with diabetes mellitus reached a significant value only in the case of endometrial carcinoma where it amounted to 26.5% (15/56). Among the several etiologic possibilities discussed the most likely appears to be that which ascribes the development of either condition to an endocrine disequilibrium.

- 65-1283 STUDY OF THE ANTIGENIC DIFFERENCES BETWEEN THE CANCEROUS AND NORMAL TISSUE OF THE RECTUM. (Rus.) Rogal'skii, V. Ia. (P. A. Herzen Oncol. Res. Inst., Moscow). Biull. Eksp. Biol. Med. 57(10):82-84, 1964.

An antigen not detectable in extracts from the normal rectal mucosa was found in tissue of a cancer of the rectum. The tumor tissue antigen was an organ-specific intestinal antigen.

- 65-1284 IODINE METABOLISM STUDIES IN CHRONIC MYELOID LEUKEMIA AND LYMPHOGRANULOMATOSIS. (Ger.) Stobbe, H. (Dept. Hemat., 1st Charite Clin. Med., Berlin), H. John, G. Schneider and I. Baer. Deutsch. Gesundheitsw. 19(45):2091-2096, 1964.

In a study of basal metabolic rate, high values were found in five-sixths of 44 pts. with longstanding chronic myeloid leukemia and lymphogranulomatosis. This is in contrast with pts. with newly contracted diseases in whom iodine

metabolism is normal. Possible relationships to the function of the thymus are discussed and pertinent literature is reviewed (25 references).

1285 STUDY OF THE NUCLEIC ACIDS DYNAMICS IN PRIMARY CULTURES AND IN CELL LINES OF NORMAL AND OF NEOPLASTIC ORIGIN BY MEANS OF FLUORESCENT MICROSCOPY. (Rus.) Dirlugian, R. P. Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Vestn. Akad. Med. Nauk SSSR 19(11):16, 1964.

A comparative study of the dynamics of nucleic acids synthesis was made in various neoplastic cell lines (HeLa, Detroit 6, No. 558 (human mammary gland), CaPa, CaVe, CaMa, As, DAPT and Ov) as well as normal cell lines No. 630 (human embryonal muscle tissue), CHE and CHET (primary human embryonal fibroblasts). RNA granule distribution in the cytoplasm was perinuclear, circumpolar or in some cases the granules showed a uniform distribution. At the time of the cell over formation RNA content gradually increased, showing its peak by day 3-4; at the time of culture stabilization (i.e. from day 3-4 to day 8-9) RNA level decreased; and during the period of evolution (i.e. from day 8-9) RNA content was increased. In degenerated dead cells RNA was absent. No specific difference was found between normal cells and cell lines of normal or of tumorous origin.

1286 A STUDY OF CHROMOSOMES IN HAEMATOLOGIC DISORDERS. (Jap., Abstract) Kosono, N. Dept. Intern. Med., Hiroshima U. Sch. Med., Japan and S. Kamata. Nippon Ketsueki Gakkai Shi (Acta Haemat. Jap.) 27(2-3):263, 1964.

Chromosome studies were performed on 9 pts. with acute leukemia and 5 with chronic myeloid leukemia. In 2 of the acute leukemia pts. there were 2 modes, 45 and 47; in the other 7 cases there was 46. More aneuploids were noted than in normal cases. In all of the chronic cases, Philadelphia chromosomes were observed.

1287 GASTRIC POLYPOSIS IN PERNICIOUS ANEMIA. EPITHELIOMATOUS TRANSFORMATION. (Fr.) Chard, A., R. Alex, J.-L. Vauzelle, A. Veyrat, P.-A. Bryon. Lyon Med. 96(24):1617-1623, 1964.

Reported is the case of a 65-year-old man who was hospitalized 5 yr. previously for pernicious anemia and in whom gastroscopy suggested the presence of small polypoid antral lesions. Five yr. later he returned with an extensive gastric epithelioma associated with antral multiple polyps. Endoscopic examination confirmed the malignant transformation of a fibropolyadenoma.

1288 CYTOGENETIC STUDIES ON MICE OF TUMOR-SUSCEPTIBLE AND TUMOR-RESISTANT INBRED

STRAINS. (E., Abstract) Varma, B. (Dept. Hosp. New York U., N. Y.) and A. Goldfeder. J. Cell Biol. 23(2):99A-100A, 1964.

65-1289 REPLICATION IN CHROMOSOMES FROM CHRONIC GRANULOCYTIC LEUKEMIA. (E., Abstract) Lima-de-Faria, A. (Inst. Genet., U. Lund, Sweden), N. O. Bianchi and P. Nowell. J. Cell Biol. 23(2):54A, 1964.

65-1290 THE ROLE OF THE THYMUS IN THE DEVELOPMENT OF LEUKEMIA. (E.) Wolff, G. S. (Marquette U. Sch. Med., Milwaukee, Wisc.). Marquette Med. Rev. 30(4):155-160, 1964.

A case report. The experimental evidence suggests that some causal relationship exists between the thymus and leukemia in man.

65-1291 STUDIES OF LYMPHOCYTES FROM PATIENTS WITH CHRONIC MYELOCYTIC LEUKEMIA. (E., Abstract) Goh, K.-O. (Dept. Med., U. Rochester Sch. Med., N. Y.). Clin. Res. 12(4):449, 1964.

65-1292 PERIPHERAL PULMONARY CANCERS ARISING IN SCARS. (Fr.) Galy, P. J. Franc. Med. Chir. Thorac. 18(6):695-701, 1964.

65-1293 REPORT OF THREE CASES OF BRONCHOPULMONARY CANCER ARISING IN SCARS. (Fr.) Delarue, J. (Paul Brousse Group Hosp., Paris), R. Depierre, R. Abelanet, J. Pointillart and Y. Pinaudeau. J. Franc. Med. Chir. Thorac. 18(6):703-718, 1964.

65-1294 CRANIAL TRAUMAS AND MENINGIOMAS. (It.) Nizzoli, V. (Inst. Nerv. Dis., U. Parma, Italy) and R. Brizzi. Sist. Nerv. 16(3):178-191, 1964.

Described are 10 pts. with intracranial meningiomas whose histories suggested a definite connection with a previous head injury.

65-1295 ETIOLOGIC AND CLINICAL CHARACTERISTICS OF BRONCHIAL EPIDERMOID CANCERS. (Fr., Abstract) Fauvet, J. Rev. Tuberc. 28(5-6):608-609, 1964.

65-1296 BOWENS DISEASE. COINCIDENCE IN SPOUSES. (Sp.) Casala, A. M., R. E. Balsa and J. Abulafia. Arch. Argent. Derm. 14(1):40-43, 1964.

65-1297 MULTIPLE PRIMARY CARCINOMAS. REPORT OF A PATIENT WITH FOUR PRIMARY MALIGNANT TUMORS. (E.) Gracey, D. R. (Mayo Clin., Rochester,

Minn.), R. E. Spiekerman, D. E. Ralston, W. H. ReMine and M. B. Dockerty. Arch. Intern. Med. (Chicago) 115(2):217-222, 1965.

65-1298 BASAL CELL EPITHELIOMA ON A PORTWINE STAIN. (E.) Sarkany, I. (Dept. Derm., Royal Free Hosp., London, W. C. 1) and G. A. Caron. Brit. J. Derm. 77(1):16-19, 1965.

A case report.

65-1299 SIMULTANEOUS OCCURRENCE OF GENITAL CARCINOMA AND SARCOMA. (Ger.) Stingl, A. (Dept. Obstet. Gynec., Municipal Hosp., Leoben, Austria). Geburtsh. Frauenheilk. 24(12):1090-1096, 1964.

A case report.

65-1300 NEOPLASTIC TRANSFORMATION IN OLD SCARS AND ULCERATIONS OF VARIOUS ETIOLOGY. (Pol.) Bernat, M. (3rd Clin. Surg., Acad. Med. Wroclaw, Poland), J. Bielawski and J. Drak. Pol. Tyg. Lek. 20(6):224-225, 1965.

Among a total of 1,128 pts. with ulcerations and fistulae of various etiologies, 2 pts. developed keratotic basocellular carcinomas. (See also CRA 3(3):#613, 1965.)

65-1301 CONSIDERATIONS ON THREE CASES OF PULMONARY TUBERCULOSIS ASSOCIATED WITH LEUKEMIA. (Rum.) Centea, A. (Dept. Physiol., Inst. Med. Physiol., Cluj, Rumania), G. Gherman, V. Moisescu and T. Lungu. Med. Intern. (Bucur.) 16(11):1377-1382, 1964.

65-1302 MALIGNANT TRANSFORMATION OF ADENOMA KIDNEY. (E.) Reddy, D. J. and D. Venkataratnam. Indian J. Surg. 24(10):804-806, 1964.

A case report of transformation to hypernephroma.

65-1303 COMPARISON OF METASTATIC GROWTH PRODUCED BY TUMOR CELL EMBOLI IN VEINS AND LYMPHATICS. (E., Abstract) Zeidman, I. (Dept. Path., U. Pennsylvania Sch. Med., Philadelphia). Proc. Am. Assn. Cancer Res. 6:71, 1965.

65-1304 MATERNAL AGE SELECTION AND MAMMARY GLAND TUMORS IN MICE. (E., Abstract) Strong, L. C. (Salk Inst. Biol. Stud., San Diego, Cal.) and F. Johnson. Proc. Am. Assn. Cancer Res. 6:62, 1965.

65-1305 A COMPARISON STUDY OF SURVIVAL, TUMOR GROWTH AND METASTASES WITH TRANSPLANTED INDUCED AND SPONTANEOUS TUMORS. (E., Abstract) Wexler, H. (NCI, Bethesda) and A. Ketcham. Proc. Am. Assn. Cancer Res. 6:68, 1965.

65-1306 A COMPARISON OF THE INCIDENCE OF MAMMARY TUMORS IN A LINE OF INBRED C3H MICE, MTI AGENT FREE (ANDERVONT), DESCENDED FROM PRIMIPAROUS MICE VERSUS A LINE DESCENDED FROM MULTIPAROUS MICE. (E., Abstract) Vellisto, I. E. (Dept. Path., Johns Hopkins Sch. Hyg., Baltimore, Md.) and F. B. Bang. Proc. Am. Assn. Cancer Res. 6:66, 1965.

65-1307 IMMUNOLOGICAL TOLERANCE TO SPONTANEOUS MAMMARY ADENOCARCINOMAS (SMC). (E., Abstract) Morton, D. L. (Dept. Surg., U. California Med. Ctr., San Francisco), L. Goldman and D. A. Wood. Proc. Am. Assn. Cancer Res. 6:47, 1965.

65-1308 DNA SYNTHESIS AND NEOPLASTIC TRANSFORMATION IN RAT LIVER PARENCHYMA. (E., Abstract) Simard, A. (Res. Lab., Cancer Ins. Montreal, Canada) and R. Daoust. Proc. Am. Assn. Cancer Res. 6:59, 1965.

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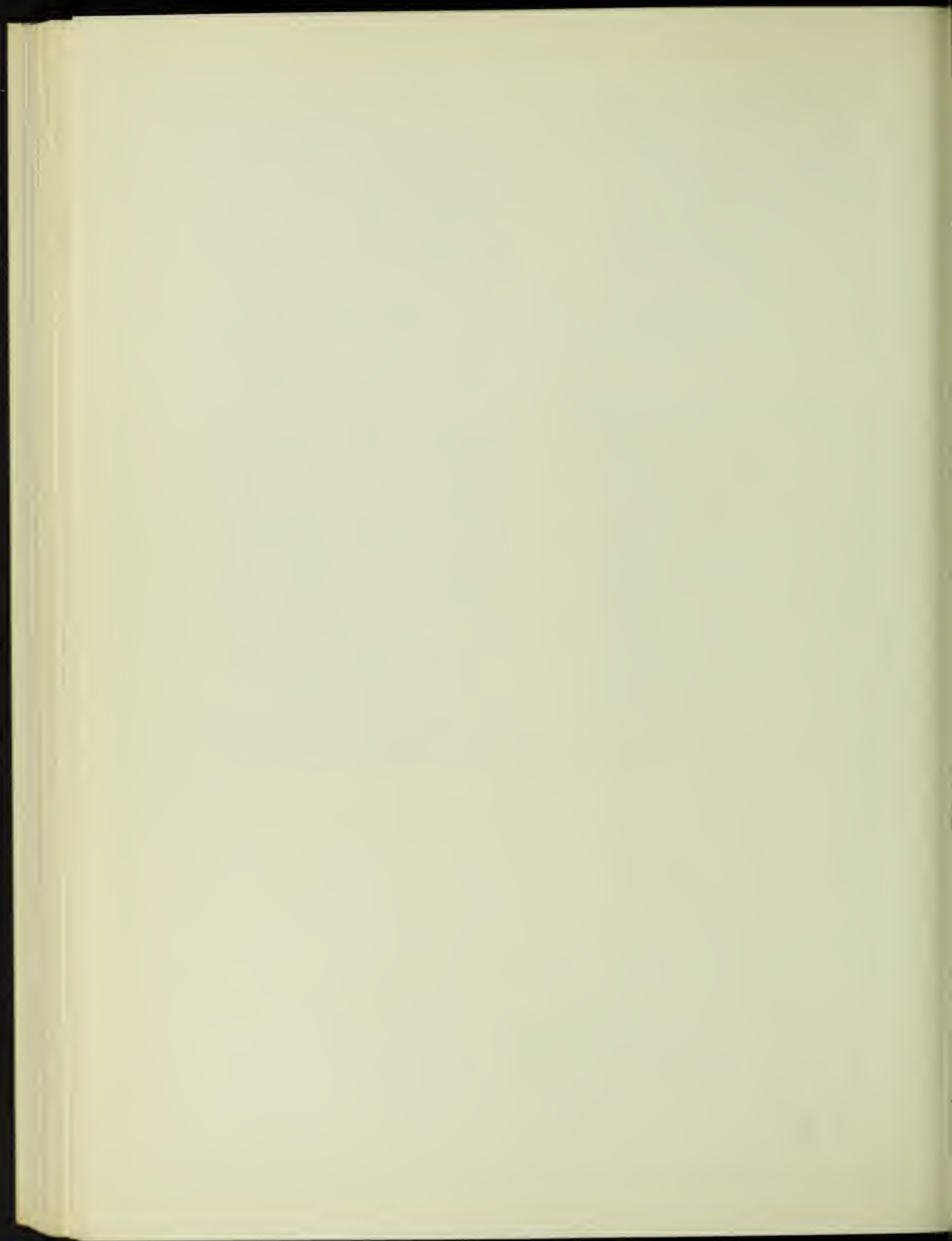
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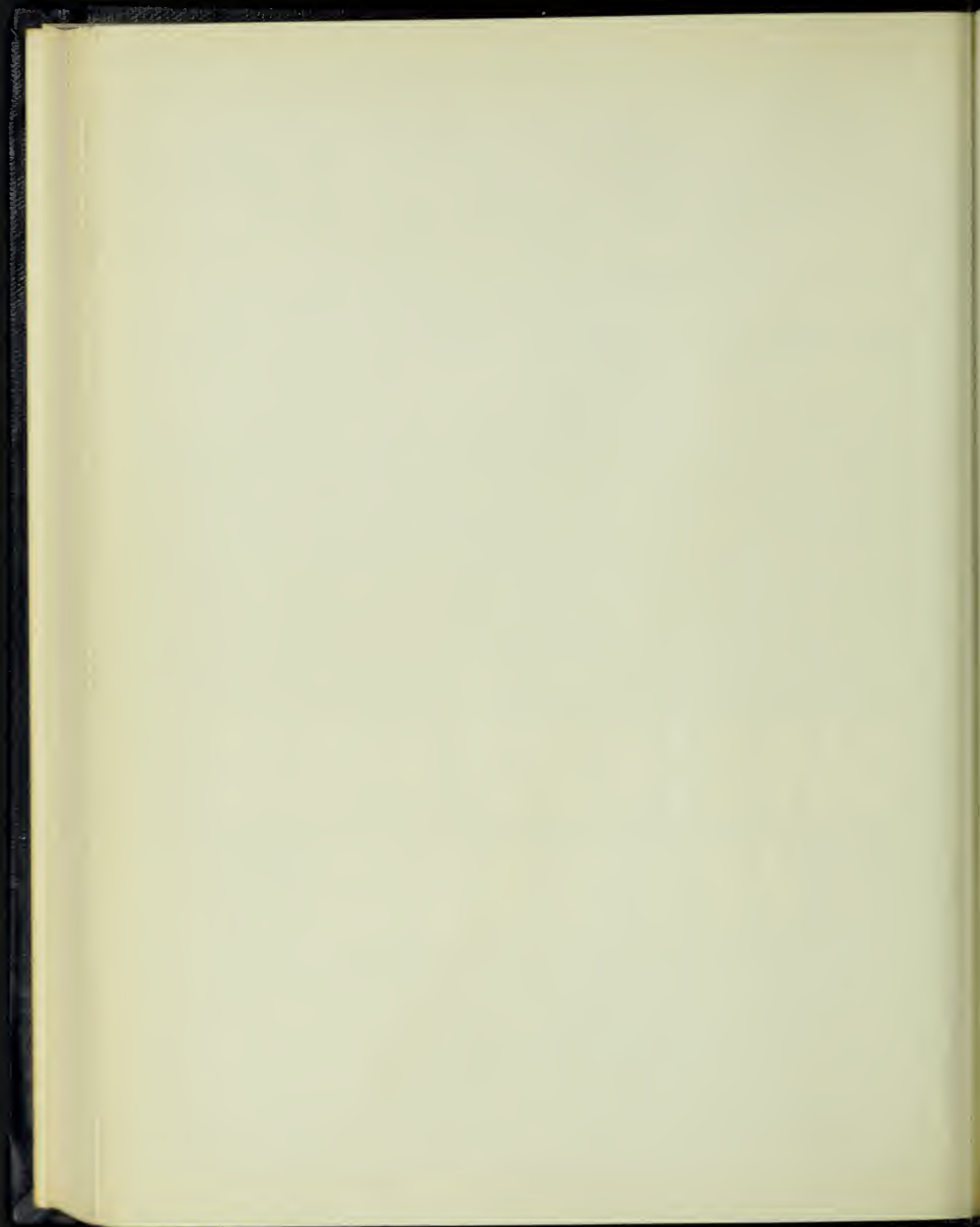
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No. 6

CARCINOGENESIS ABSTRACTS

National Cancer Institute

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE Public Health Service



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ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	cytopathic effect	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	Ice.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	Ind.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

1309 SEVERAL ASPECTS OF MAMMARY CARCINOMA. I. INCIDENCE AND MORTALITY. (Flem.) Oois, J.-M. Belg. T. Geneesk. 20(18):982-986, 1964.

In females in Belgium, the percentage incidence of deaths due to mammary carcinoma relative to deaths due to all neoplasms was approx. 15% in the yr. 1958-61 inclusive; incidence as a percentage of all deaths ranged from 2.91%-3.09% in the yr. 1958-60. Breast carcinoma was exceeded in women only by carcinoma of the stomach, the incidence of which was 16%. The relative frequency of deaths due to mammary carcinoma increased progressively with age, reaching a maximum at 60-64 yr. (4 references)

1310 THE ORGANIZATION OF STUDIES ON THE RESULTS OF THE THERAPEUTIC TREATMENT OF MALIGNANT NEOPLASMS OF THE FEMALE GENITALIA. (I.) Massone, G. (Dept. Obstet. Gynec., Univ. Bari, Italy). Atti Soc. Ostet. Ginec. 13(2):193, 1964.

Included in this report are previously published data on the av. yearly increase of the cancer mortality in Italy during 1955-1959 and on the relative mortality (per 100,000) from cancer of the breast, uterus and other genital organs of females during the same period. (No references)

1311 REACTION OF SOME MUTAGENIC AND CARCINOGENIC COMPOUNDS WITH NUCLEIC ACIDS. (I.) Brookes, P. (Chester Beatty Res. Inst., London) and P. D. Lawley. J. Cell Comp. Physiol. 2(Pt. 2):111-127, 1964.

A portion of this paper was reported as CRA 1(8):#1016, 1964. In addition, carcinogenesis by aromatic hydrocarbons is also reviewed, and a suggestion made that DNA may be the essential cellular receptor of these carcinogens. The subject was further explored in an open discussion, the report of which is included in the paper. (See also CRA 2(5):#905, 1964.) (43 references)

1312 ON TUMORIGENESIS. REDUCTIONAL MITOSIS AND TUMOR GROWTH. (It.) Chesi, O. (Pt. Gen. Surg., Mandamentale Hosp., Tione di Trento, Italy). Minerva Ginec. 16(13):562-564, 1964.

In a brief review of common theories of carcinogenesis, the author advances the hypothesis that the first step in the genesis of a tumor involves a pathological reductional division which brings about the formation of 2 haploid cells. Fusion of the two haploid cells, which represents a precancerous state, then results in a tumor. If the cells resulting from the fusion

have normal chromosomes, the tumor will be benign; otherwise, it will be autonomous and biologically independent, thus malignant. (14 references)

65-1313 EXOGENOUS AGENTS WITH CARCINOGENIC ACTIVITY IN MAN. ENVIRONMENTAL AND OCCUPATIONAL CARCINOGENESIS. (It.) Maltoni, C. Bull. Sci. Med. (Bologna) 136(2):135-143, 1964.

In a brief discussion the author describes methods of identification of carcinogenic agents for man. There is described all the agents (chemical and physical) which are known or suspected to be carcinogenic for man, as well as preventive measures used to combat them. (No references)

65-1314 VIRUSES AND CANCER IN ANIMALS AND MAN. (E.) Dmochowski, L. (U. Texas M. D. Anderson Hosp., Houston). Southern Med. J. 57(11):1267-1272, 1964.

A review and discussion of viral etiology of cancer are presented. Evidence is presented of virus particles or virus-like particles in the milk of mice with a high incidence of mammary cancer and in the milk of a woman, the leukemic tissues of a mouse, a rat, and a pt. with lymphatic leukemia. These viruses resemble myxovirus (influenza) in appearance. The "micro-epidemiology" of human cancer is being investigated in certain families and areas. (See also CRA 1(8):#1433, 1963; *ibid.*, 3(2):#291; and *ibid.*, 3(4):#809, 1965.) (5 references)

65-1315 ALTERED TEMPLATE STABILITY: THE MOLECULAR MASK OF MALIGNANCY? (E.) Pitot, H. C. (McArdle Mem. Lab., U. Wisconsin Sch. Med., Madison). Perspect. Biol. Med. 8(1):50-70, 1964.

The author discusses extensively the myriad aspects of malignant disease and presents various definitions of cancer. The mechanisms of normal controls in normal cells and the relative autonomic control, or aberration in control, of neoplastic cells are described. After reviewing enzyme synthesis and the concept of template stability, the alteration of the latter (by the environment or by "inducers") and its implications in malignant disease are considered. (51 references)

65-1316 *IN VITRO* CULTURE OF LEUKEMOGENIC VIRUSES. (Fr.) Levy, J.-P. (Inst. Leukemic Res., Saint-Louis Hosp., Paris) and J. Peries. Path. Biol. (Paris) 12(21-22):1158-1162, 1964.

The authors review procedures for the *in vitro* cultivation of leukemogenic viruses using leukemic or healthy cells. Best results were obtained with

avian myeloblastosis virus making possible relatively thorough virological studies. For other viruses, especially those of murine leukemia, results were less satisfactory. (38 references)

65-1317 STUDIES ON IMMUNOLOGICALLY DETERMINED HOST RESISTANCE AGAINST VIRUS INDUCED NEOPLASMS. (E.) Sjögren, H. O. Tryckeri Balder AB, Stockholm, 1964, 27 pp.

A review and discussion of host resistance to transplantation of viral tumors are presented. See CRA 2(5):#924, #925, #926, and #927, 1964. (See also CRA 1(5):#898, 1963; *ibid.*, 2(2):#313; and *ibid.*, 2(4):#609, 1964.) (69 references)

65-1318 PROGRESS IN TUMOUR VIRUS RESEARCH. (E.) Koprowski, H. (Wistar Inst. Anat. Biol., Philadelphia, Pa.). *Triangle* 6(7): 252-258, 1964.

A discussion and review of the present status of tumor virus research are presented, incorporating some of the previously published work from the author's laboratory. Chiefly discussed is the SV40 transformation of human cell cultures *in vitro*. See CRA 1(3):#480; *ibid.*, (8):#1560, 1963; and *ibid.*, 2(8):#1507, 1964. (See also CRA 1(5):#893; *ibid.*, (6):#1139 and 1140; and *ibid.*, 1(8):#1560, 1963.) (12 references)

65-1319 EFFECTS OF DIETHYLSTILBESTROL ON BETA-GLUCURONIDASE ACTIVITY OF HAMSTER LIVER AND KIDNEY: HISTOCHEMICAL, BIOCHEMICAL AND BIO-METRICAL STUDY. (E.) Manning, J. P., L. F. Cavazos, W. M. Feagans and M. E. Turner. *Acta Anat. (Basel)* 58(Suppl. 51):1-48, 1964.

In connection with a biochemical study, an extensive review is presented of estrogen-induced tumors. (121 references)

65-1320 PRECANCEROUS SKIN LESIONS AND SYSTEMIC CANCER. (E.) Graham, J. H. (Dept. Derm., Temple U. Sch. Med., Philadelphia, Pa.) and E. B. Helwig. Pp. 209-222 in *Tumors of the Skin*. Cumley, R. W., J. McCay, D. Aldridge, S. Connelly, J. Haroz, A. Reiner and W. White (Eds.). Year Book Med. Publ., Inc., Chicago, 1964, 322 pp.

This study on the relationship between precancerous skin lesions and systemic cancer includes data on the association of Bowen's disease and systemic cancer already abstracted as CRA 2(1):#132, 1964. Of 22 pts. with arsenical keratosis, 3 were found to have systemic cancer localized in the ampulla of Vater (1), breast (1) and ileum and appendix (1). Because of the gross, microscopic and chemical similarities of Bowen's disease and arsenical keratosis, it is the authors' opinion that arsenic is probably a common etiologic

factor. Over one-half of the pts. with extra-mammary Paget's disease have an associated adenocarcinoma of the skin, regional cancer or breast carcinoma. Squamous cell carcinoma will occur in at least 12% of pts. with lesions of senile keratosis. The likelihood of systemic cancer is less in pts. with erythroplasia of Queyrat and intraepidermal epithelioma of Jadassohn. (See also CRA 1(3):#380, 1963.) (24 references)

65-1321 SUMMARY OF THE REPORT OF THE SURGEON GENERAL'S ADVISORY COMMITTEE ON SMOKING AND HEALTH. Public Health Serv. Publ. #1103-D. U.S. Dept. Health, Educat., Welfare, Washington, D. C., 1964, 11 pp.

Highlighted are the findings and conclusions of the original report of the Surgeon General's Advisory Committee on Smoking and Health. (See CRA 1(11):#1996, 1964.) (4 references)

65-1322 CANCER OF THE UTERUS. FROM GROSS APPEARANCES TO ULTRASTRUCTURE. 2nd Ed. (Transl. from *Il Cancro Dell 'Utero*, 1960). Sirtori, C. and E. Morano. Charles C. Thomas (Publ.), Springfield, Ill., 1963, illustr., 383 pp.

The concluding 2 sections (before a final summation) of this translated work contain material of especial interest to those working in the field of carcinogenesis. Ultramicroscopic differences between benign and malignant cells are summarized at the end of a comprehensive study at the gross cellular and subcellular level of normal, precancerous and cancerous cells in the uterus. Most of the changes noted are interpreted as due to altered RNA, and therefore of protein synthesis. Inclusion bodies of an unknown nature (possibly viral) are described in adenocarcinomas, adenocarcinomas and in carcinomas of the ectocervix, but not in normal endometrium. In the senile endometrium two cell types are distinguished, the first with a prelethal character, the second with features resembling those of carcinoma cells. In the authors' opinion these cells may represent accumulated mutants caused by the "insults" received by the cell during its lifetime, including errors in DNA replication, in RNA template and protein synthesis, reduction of oxygen supply, and alterations by endogenous and exogenous substances. This English edition contains a great deal of material not present in the original Italian edition, including descriptions of senile changes and of ultrastructural changes after radium, radioactive isotopes or high voltage therapy. (About 550 references)

65-1323 "PRECANCEROUS" CHANGES IN THE BLADDER. (Dut.) Lauwers, G. T. (Dept. Urol., Anthony's Hosp., Utrecht, The Netherlands). *Geneesk. Gids* 42(20):422-424, 1964.

In a review of studies of precancerous tissue

ges in the bladder, the author suggests that biologically-confirmable tissue changes may be induced by long-term, biochemical "environmental" abnormalities, at least some of which may be amenable to objective demonstration prior to obtaining a frankly pathological effect. In this respect, the role of β -glucuronidase in vesical carcinogenesis is considered questionable; however, that of its hydrolytic product, 2-amino-1-methyl HCl and other amines such as 3,4,5,6-dimethylcarbazole, 3-hydroxyanthranilic acid (tryptophan derivative) et al. is considered at least potentially significant. (10 references)

324 PROBLEMS RELATED TO BIOLOGICAL TRIALS WITH ANTITUMOR SUBSTANCES. (It.)

Di L. (Inst. Path. Anat., U. Perugia, Italy). Lavori Ist. Anat. Univ. Perugia 24(2): 15, 1964.

A review summarizing the present status of experimental cancer chemotherapy and its various problems, the author stresses the danger of using main chemotherapeutic agents which may themselves possess carcinogenic activity. Some ones used in therapy also may promote carcinogenesis. (39 references)

325 VIRUSES AND NEOPLASMS. (It.) Lenti, G. (Inst. Gen. Clin. Med., U. Turin, Italy) and A. Pellegrini. Rass. Med. Sarda 6(6):91-109, 1964.

A review is presented of the most important and recent aspects of the relationship between viruses and neoplasms. (45 references)

326 POTASSIUM AND CANCER. (Fr.) Guerrin, A. Rev. Path. Comp. 25-227, 1964.

Thoroughly reviewed is the present medical and biological position of potassium in relation to cancer and to carcinogenesis. (See also 3(6):#1414, 1965.) (5 references)

327 OCCUPATIONAL PRECANCERS AND CANCERS OF THE SKIN AND PREVENTIVE MEASURES. Chiurco, G. A. (Umberto I Policlin., Rome, Italy). Acta Un. Int. Cancr. 19:477-480, 1965.

The author discusses various occupational cancers and precancerous lesions encountered from 1950-61 at various precancer study centers in Rome. Both individual and social preventive measures are described. In a review of various methods of treatment, the author recommends surgical treatment of precancerous skin lesions and condemns cauterization and cryotherapy. (See also 3(2):#218, 1965.) (3 references)

65-1328 CARCINOGENIC ACTION OF ETHYL URETHAN (ETHYL CARBAMATE) AND ITS POTENTIAL DANGER IN HUMAN CARCINOGENESIS. (Por.)

De Azevedo e Silva, E. (Dept. Physiol., U. Recife Sch. Sci. Med., Pernambuco, Brazil). An. Fac. Med. Univ. Recife 23(1):213-223, 1963.

A review of the experimental evidence accumulated in the literature in relation to the carcinogenic activity of urethan shows that this agent is a multipotential carcinogen. Although instances of urethan-induced cancer in humans have not been reported, it remains a potential danger due to its widespread use in many pharmaceutical preparations. (43 references)

65-1329 SOME ASPECTS OF THE CARCINOGENIC AND ANTITUMOR ACTIVITY OF URETHAN. (It.)

Bonmassar, E. (Inst. Pharm., U. Milan, Italy). Arch. Ital. Pat. Clin. Tumori 7(1-2):145-161, 1964.

In a review analyzing the multipotential aspects of the biological activity of urethan, the author discusses the characteristics and mechanism of action of its carcinogenic action. (107 references)

65-1330 INDUCTION OF TUMORS BY IONIZING RADIATION. (Dut.) Van Bekkum, D. W.

(Inst. Radiol., Rijswijk, The Netherlands). Nederl. T. Geneesk. 108(42):1977-1982, 1964.

A general review and discussion of the risks of tumor and/or leukemia-induction involved in radioactive fall-out, diagnostic and therapeutic X-irradiation and other sources of radioactivity include discussion of the theoretical mechanisms of action involved and of currently accepted safe limits of exposure. (10 references)

65-1331 IONIZING RADIATIONS AND INCIDENCE OF LEUKEMIC DISEASE. (It.) Pisani, G.

(Inst. Radiol., Maggiore Hosp., Novara, Italy). Osped. Maggiore Novara 40:141-149, 1963.

In a review of the leukemogenic effects of radiation, the author notes the lack of a threshold radiation dosage and of a linear relationship of dose to effect. Fractionation dosage, latency period and resistance or sensitivity to the leukemogenic effect of radiation are also discussed. (31 references)

65-1332 HEMATOLOGIC FINDINGS IN HUMAN RADIO-LEUKEMIAS. (It.) Nuvolone, U. (Inst. Radiol., Maggiore Hosp., Novara, Italy). Osped. Maggiore Novara 40:160-166, 1963.

In a literature survey covering the period 1950-60, 209 cases of leukemia following irradiation were

tabulated, of which 116 were related to atom bomb exposure, 81 to therapeutic exposure and 12 to professional exposure. According to hematologic type, 71 (34%) were chronic myeloid, 70 (33.5%) acute myeloid, 27 (13%) acute unclassified, 24 (11%) acute lymphatic, 12 (6%) acute monocytic and 5 (2.5%) chronic lymphatic. (9 references)

- 65-1333 MEDICAL IMPLICATIONS OF AIR POLLUTION. (Dut.) Tesch, J. W. Nederl. I. Geneesk. 108(42):2029-2034, 1964.

In a general review and discussion of the role of air pollution in bronchitis, pulmonary cancer, et al., the author concludes that primary attention should be given to the cumulative effect of many etiologic factors, rather than a search for a single source or agent. In this connection, he cites studies from England, South Africa, New Zealand, and other places, which appear to confirm that genetic considerations, climatologic factors, and air pollution tend to increase susceptibility to the development of pulmonary cancers among cigarette smokers, suggesting that a combination of predisposing "background" or "backgrounds" and specific, exogenous stimuli are probably involved. (22 references)

- 65-1334 RECENT DATA ON THE ROLE OF THE THYMUS IN HEMATOLOGY. (Fr.) Lévy, J. P. (Leukemia Res. Inst., Saint-Louis Hosp., Paris), P. Lortholary and A. Manus. Rev. Prat. 14(31): 33-38, 1964.

It now appears well established that the thymus, either by means of its cellular cycle or through humoral factors, plays an essential role in lymphopoiesis, immunity and the development of thymoma and lymphoid leukemogenesis in certain species. (16 references)

- 65-1335 HEMATOPOIETIC TUMORS OF DOMESTIC ANIMALS. (Fr.) Squire, R. (Dept. Path., New York State Vet. Coll., Ithaca). Nouv. Rev. Franc. Hemat. 4(6):825-866, 1964.

A general review summarizing present knowledge on the frequency, etiology, symptomatology, hematologic and the pathologic anatomical aspects, and therapy of neoplasms of the hematopoietic organs of domestic animals (including cattle, dog, cat, horse, swine, rabbit, sheep, goat and monkey). Consideration of chickens is not included. (208 references)

- 65-1336 HEMATOPOIETIC TUMORS OF DOMESTIC ANIMALS. (E.) Squire, R. A. (Dept. Path., New York State Vet. Coll., Ithaca). Cornell Vet. 54(1):97-150, 1964.

An English translation of the preceding French paper. (208 references)

- 65-1337 EVOLUTION OF SOME BIOLOGIC CHARACTERISTICS OF SKIN EPITHELIUM IN THE PROCESS OF CARCINOGENESIS. (Rus.) Vasil'ev, Iu. M. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Vestn. Akad. Med. Nauk SSSR 19(11): 23-28, 1964.

A review is presented on the changes in the capability of mouse and rabbit skin epithelium for invasive growth during various stages of chemical carcinogenesis (s.c. scarlet red and or topical 9,10-dimethyl-1,2-benzanthracene). It is concluded that the epithelial sensitivity toward the agents (e.g., scarlet red, which changes the state of surrounding tissue and caused inv. growth) was increased during the course of carcinogenesis, particularly in the later stages. The ability of the epithelium to induce fibroblastic proliferation in the surrounding tissue was also stimulated. (See also CRA 1(12):#207 1964.) (10 references)

- 65-1338 CHEMICAL CARCINOGENESIS AND CANCERS. Hueper, W. C. and W. D. Conway. Chapman & C. Thomas (Publ.), Springfield, Ill. 1964, 744 pp., \$20.00.

After an extensive review in tabular form of environmental carcinogens, both known and suspected, the route of exposure to them and the target organs on which they act as well as their economic importance, and the occupational and environmental hazards which they present, the authors consider the properties and classification of chemical carcinogens and present a tabulation of the production of cancers in experimental animals with occupational carcinogens. The methods for obtaining statistical evidence and for handling epidemiological data are reviewed critically. The effect of chemical carcinogens on the epidemiology of a causation of cancer in the general population is considered in detail, with emphasis on geographical differences in certain cancer rates as well as the significance of recent changes in demographic and regional cancer rates. Following a review of the principles of carcinogenic screening required to develop testing methods for hazardous chemicals, the authors review the physicochemical properties and carcinogenic activity of aromatic hydrocarbons, aromatic amines and related nitro compounds, aromatic azo compounds and their heterocyclic analogs, heterocyclic and aliphatic compounds, inorganic compounds. The bioassay is considered from many angles: animal care, protection of laboratory personnel, keeping of records and special aspects of such carcinogenesis studies are discussed in detail. The final chapter of this excellent book is concerned with prevention of environmental cancer, including legal and medico-legal aspects. (>2500 references; see bibliography of publications (83) or W. C. H.

- 65-1339 RECENT ACQUISITIONS WITH REGARD TO VIRAL ETIOLOGY OF MALIGNANT TUMORS

Calì, A. Riv. Anat. Pat. Oncol. 25(3):
-ccviii, 1963.

rief survey of virus-induced neoplasms in
als and experimental evidence dealing with
recent observation that the same virus can
athogenic to more than one animal species.
problems which one encounters in the study
probable viral etiology of malignant tumors
umans are discussed. (No references)

340 TUMOR PROGRESSION AND CHEMOTHERAPY.
(It.) Squartini, F. (Inst. Pathol.
, U. Perugia, Italy). Lavori Ist. Anat.
. Perugia 24(2):83-93, 1964.

review of the literature and personal ex-
ence, the author analyzes the general princi-
of tumor progression and its significance
elation to cancer chemotherapy. Also sum-
zed are the results of 5 yr. of personal
arches (part of which were previously re-
ed in CRA 1(1):#129; and ibid., (2):#176,
) devoted to the elucidation of factors re-
sible for the delayed progression of mammary
rs in RIII mice, a strain which carries the
ary tumor virus (MTV). It is concluded that
progression of MTV-induced tumors in RIII
is inhibited by another virus which is not
ve in this strain but is leukemogenic when
mitted through milk in BALB/c mice (see
1(3):#457, 1963). (31 references)

341 THE GENETIC THEORY OF CANCER. (Sp.)
Meneses Hoyos, J. (U. Mexico Sch. Med.,
co City, D. F.). Medicina (Mex.) 44(953):
579, 1964.

eneral review of the literature selecting the
significant experimental evidence in favor
the modern theory that cancer is due to a
tion or alteration of genes of the cell
eus and cytoplasm resulting in the formation
new cell by altered metabolism which is
erous. A critical discussion of other theo-
of carcinogenesis is included. (61 refer-
s)

42 IMMUNOLOGY WITH REGARD TO CANCER.
(Fr.) Bradshaw, L. R. A. Bruxelles
45(1):9-13, 1965.

view which analyzes various approaches toward
ection against cancer, all based on the ex-
nce of specific anticancerous antigens.
(references)

65-1343 CIGARETTE SMOKING AND SUICIDE. (Dut.)
Drogendijk, A. C. (Free U., Amsterdam,
The Netherlands). Nederl. T. Geneesk. 108(52):
2481-2485, 1964.

In a general review of statistics dealing with
smoking and the mortalities due to lung cancer,
the author discusses the allegation that cigarette
smoking may represent a death-wish on the part
of the smoker. He concludes that this interpre-
tation is not justified, despite the lack of gen-
eral response to anti-smoking campaigns. (No
references)

65-1344 PHOTOACTIVATION OF POLYNUCLEAR HYDRO-
CARBONS. (E.) Epstein, S. S. (Dept.
Path., Harvard Sch. Med., Boston, Mass.). Arch.
Environ. Health (Chicago) 10(2):233-239, 1965.

A review of material previously reported in CRA
1(2):#192; ibid., (4):#692; and ibid., (5):#858,
1963; ibid., (9-10):#1778, and ibid., 2(8):#1497,
1964; ibid., 3(3):#457; and ibid., (4):#784, 1965
is presented. (24 references)

65-1345 SOME THOUGHTS ON MALIGNANT GROWTHS.
(E.) Yoshida, T. (Sasaki Inst., Tokyo).
Nat. Cancer Inst. Monogr. (16):1-6, 1964.

65-1346 CURRENT VIEWS ON CARCINOGENESIS. (Jap.)
Ota, K. (Tokyo U. Sch. Med., Japan).
Sogo Rinsho (Clin. All-Round) 14(1):2-9, 1965.

65-1347 THE HEREDITY OF HUMAN CANCER. (E.)
Pack, G. T. (Pack Med. Found., Inc.
New York, N. Y.). Bull. Weiss Mem. Hosp. 6(1):
10-20, 1964.

65-1348 THE AETIOLOGY OF LEUKAEMIA: THE PRESENT
POSITION. (E.) Bernard, J. (Res.
Inst., U. Paris Sch. Med., Sorbonne). Pp. 84-89
in Research Reviews 1963-1964. Carrick,
D. J. E. L. (Ed.), Medical New Ltd., London, 1964,
227 pp.

65-1349 THE THYMUS AND ITS ROLE IN IMMUNITY AND
CARCINOGENESIS. (E.) Metcalf, D.
(Walter-Eliza Hall Inst. Med. Res., Roy. Melbourne
Hosp., Australia). Med. J. Aust. 1(7):225-230,
1965.

65-1350 CANCER AS A PROBLEM IN SOCIAL MEDICINE.
(Nor.) Socialmed. T. 40:225-226, 1963.

See also abstract nos.: 1603, 1604

PHYSICAL CARCINOGENESIS

65-1351 A STATISTICAL STUDY ON HUMAN CANCER INDUCED BY MEDICAL IRRADIATION. (E.)

Takahashi, S. (Dept. Radiol., Nagoya U. Sch. Med., Japan), T. Kitabatake, M. Wakabayashi, Y. Koga, T. Miyakawa, H. Yamashita, M. Masuyama, S. Hibino, M. Miyakawa, S. Okajima, H. Kaneda, H. Tchiiri, Y. Anno, H. Irie. Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 23(12):1510-1530, 1964.

An extensive retrospective survey was conducted to ascertain whether or not Japanese cancer pts. had had radiation therapy (for benign diseases) 3 yr. or more prior to the presumed onset of cancer. Histories of professional exposure and exposure to the atomic bomb were also checked, and these cases were excluded. (The net number of cancer cases studied was 8,923.) A similar survey was carried out on non-cancer pts. as controls (11,556 cases). The cancer group was found to have had more prior radiation exposure than the control group, particularly in the case of skin, thyroid, and various neck cancers. When cancer of the skin, thyroid, and neck was studied as a group, the relative risk for radiation-induced cancer was represented by a linear relationship to the radiation dose. (See also CRA 3(1): #32, 1965.)

65-1352 CONTRASTING INCIDENCE OF ACUTE MONOCYTIC AND GRANULOCYTIC LEUKEMIAS IN P32-TREATED PATIENTS WITH POLYCYTHEMIA VERA AND CHRONIC LYMPHOCYTIC LEUKEMIA. (E.) Osgood, E. E. (Div. Exp. Med., U. Oregon Sch. Med., Portland). J. Lab. Clin. Med. 64(4):560-573, 1964.

Intravenous P^{32} therapy and follow-up studies for a minimum of 8 yr. after the first dose were carried out on 101 consecutive pts. with polycythemia vera (PV; 58 male, 43 female; 28-80 yr. old, av. 57 yr.) and on 201 consecutive pts. with chronic lymphocytic leukemia (CLL; 134 male, 67 female; 30-95 yr. old, av. 62 yr.). The incidence of acute leukemia (AL) among the pts. with PV was approx. 14% (14/101; 6 acute granulocytic and 8 monocytic leukemias; expected number 6.35). AL in pts. with CLL was 2.5% (5/201; 5/5 monocytic leukemias; expected number 12.65).

65-1353 ULTRAVIOLET-INDUCED CORNEAL TUMORS IN DIFFERENT SPECIES AND STRAINS OF ANIMALS. (E.) Freeman, R. G. (Dept. Derm., Baylor U. Coll. Med., Houston, Texas) and J. M. Knox. J. Invest. Derm. 43(5):431-436, 1964.

Pigmented (P) and nonpigmented (NP) rats, mice, hamsters, and guinea pigs were exposed to UV irradiation for 2-10 min. 5 days per wk. for 1 yr. or until both eyes contained well-developed tumors. Resulting corneal tumors were either

fibrous tumors (fibrosarcomas) or hemangioendotheliomas. In the different strains of rats, the number of tumors/number of eyes was as follows: black 42/66; black and white 31/34; gray brown 17/20; gray and white 6/12; albino 2/24. The percentage of eyes with tumors in P and NP strains resp., at 180 days was as follows: for rats 37 and 7; for mice 19 and 7; for hamsters 37 and 5; for guinea pigs 0 and 0. The percentage of eyes with tumors at 1 yr. and the av. time (in days) of onset of tumors were, resp., as follows: P rats 67% (193); NP rats 8% (283); P mice 51% (199), NP mice 55% (231); P hamsters 50% (200), NP hamsters 2% (259); P and NP guinea pigs 0% and 0. The observation that pigmented animals of several species developed corneal tumors more readily than their corresponding albino strains is discussed.

65-1354 STRONTIUM-89-INDUCED BONE TUMOUR IN THE RAT. (E.) Kowalewski, K. (Surg. Res. Inst., U. Alberta, Edmonton, Canada) and A. E. Rodin. Canad. J. Surg. 7(2):204-215, 1964.

After 6 monthly i.p. inj. of 0.7 μ C/g body wt. Sr^{89} , the 232/300 surviving male Sprague-Dawley rats were divided into various groups 7 mo. after the first inj.: Group 1 received no further treatment; Group 2 was treated with 7 α -methyl-19-nortestosterone cyclopentylpropionate (U-24813; 1 mg/100 g every wk.) and methylprednisolone acetate (MPA; 1 mg/10 g i.m. every 10 days); Group 3 was treated with above dosage of MPA alone. Control Groups 4, 5 and 6 received the same treatment, resp., as Groups 1, 2 and 3, but without Sr^{89} . A delay in mortality was shown in animals of Group 2 (no deaths in mo. 7 and 8 while Group 1 showed significant protection for a longer time. After mo. 11, the total number of animals with tumors for Groups 1, 2 and 3 was 38/99 (38%), 27/44 (61%) and 31/89 (35%), resp. In Groups 1, 2 and 3, resp., most tumors were in the limb--30, 31 and 31; 5, -- and 3 were in spine; 3, 5 and -- were in the pelvis. Considerable variety in the histological pattern of tumors was observed: typical osteogenic sarcoma with varying amounts of osteoid and bony trabeculae; tumors with abundant malignant cartilage resembling chondrosarcoma and tumors with spindle-shaped cells identical to those of fibrosarcoma and containing little cartilage, osteoid or bone. Both the transplantation of these tumors and growth in tissue culture were successful. Hexosamine, hydroxyproline and total N were increased in Sr^{89} -treated rats in the premalignant period, were higher in Group 2 than in Group 3 rats and were decreased in Group 6.

65-1355 GASTROINTESTINAL TRACT TUMORS INDUCED BY RADIOCERIUM (Ce^{144}). (E.) Leber, G. A. Fed. Proc. 23(3)(Pt. 2):T526-T528, 1964.

English version of a Russian article originally published in *Arkh. Pat.* 25(5):40-45, 1963.
CRA 1(5):#815, 1963.

56 LUNG CANCER OF URANIUM MINERS ON THE COLORADO PLATEAU. (E.) Saccomanno, G. (St. Mary's Hosp., Grand Junction, Colo.), Archer, R. P. Saunders, L. A. James and Beckler. *Health Phys.* 10(12):1195-1201, 1964.

A study of 51 lung cancer deaths among uranium miners (UM), small cell undifferentiated tumors found in 57%, whereas only approx. 15% of tumors in 51 controls (C; matched for age and smoking habits) were of this type. The median age was 54 yr. for UM in contrast to about 64 yr. for C. All phases of the clinical course of lung cancer among the UM tended to be accelerated when compared to those among C. Among UM, 59% of tumors arose in the hilar area, whereas only 15% of tumors among C originated in this area.

57 TISSUE REACTIONS AND DOSE RELATIONSHIPS IN RATS FOLLOWING INTRAPULMONARY RADIATION. (E.) Laskin, S. (Dept. Environ. Path., New York U. Sch. Med., N. Y.), Schneider, B. Altschuler and N. Nelson. *Health Phys.* 10(12):1229-1233, 1964.

A study of 8-10 Wistar rats given intrabronchial injections of 5 μ C of Ru^{106} were sacrificed at different times from a mean of 122 days to 357 days. Mean dose varied from $4.2-7.7 \times 10^5$ rads per rat. Percent with cancer, starting from the lowest dose, was 0.0, 15.4, 30, 60, 81.3, 90, 88.9, 100. Similar results were obtained with P^{32} which were allowed to die spontaneously after implantation. Intrabronchial plastic implants containing doses of P^{32} of 0.2, 2 or 20 μ C were used to deliver 10^3 , 10^4 , or 10^5 rads, resp. to squamous cell carcinomas (arising in the bronchial epithelium) in 0/15, 5/15, 0/20, resp. These tumors had pathological features identical to those due to Ru^{106} exposure. The tumor yields with P^{32} were comparable with Ru^{106} . No carcinomas were found in several thousand controls given non-radioactive platinum or rhodium. (See also CRA 1(7):#815, 1963.)

58 EXPERIMENTAL OVARIAN TUMORS IN RATS. (E.) Ird, E. A. (Inst. Exp. Clin. Med., USSR Acad. Med. Sci., Moscow). *Bull. Biol. Med. (Eng.)* 57(3):337-339, 1964.

This article is the English version of a Russian article appearing in *Biull. Eksp. Biol. Med.* 57(3):89-91, 1964. See CRA 2(6):#1039, 1964.

59 ASBESTOSIS AND LUNG CANCER. (E.) Williams, W. J. (Inst. Path., Welsh Nat. Sch. Med., Cardiff, Wales, Great Britain). *Arch. Environ. Health (Chicago)* 10(1):44-45, 1965.

A total of 10 carcinomas of the main bronchi, distal air passages, and pleura was found among 52 American cases of asbestosis due to occupational exposure; this incidence was similar to that reported in Britain. Three cases had been previously described. While tuberculosis and silicosis occurred in the series of 52, neither involved the carcinoma pts.

65-1360 ASBESTOSIS AND PULMONARY CARCINOMA. (E.) Dutra, F. R. (Brookdale Hosp. Ctr., Brooklyn, N. Y.) and J. D. Carney. *Arch. Environ. Health (Chicago)* 10(3):416-423, 1965.

A case report is presented in which asbestos bodies and lung tumors were found in an individual with no known, definite, exposure to asbestos. At one time he did work as a "pipe fitter".

65-1361 PATHOLOGY OF MULTIPLE INTRAVENOUS DOSES OF POLONIUM. (E.) Casarett, G. W. (Dept. Radiat. Biol., U. Rochester Sch. Med. Dent., N. Y.). *Radiat. Res. (Suppl. 5)*:347-360, 1964.

Histopathologic studies were made in Rochester ex-Wistar albino rats (both sexes; 54-95 days old; 170-200 g) dying spontaneously after repeated monthly i.v. inj. of polonium chloride in doses (μ C/kg/mo.) of 0.023 (Group A), 0.1 (Group B), 0.3 (Group C) and 1.5 (Group D). The incidence of malignant neoplasms in male rats (total number) of Groups A (87), B (97), C (16) and D (12) was: reticulum cell sarcoma 19.5%, 20.6%, 18.7%, and 0%, resp., as compared to 10.2% in 59 controls; bronchogenic carcinoma 4.6%, 1.0%, 0%, and 0%, resp., as compared to 3.4% in controls; adrenal pheochromocytoma 3.4%, 3.1%, 0%, and 0%, compared with none in controls. Among female rats (total number) in the same 4 groups, the incidence of mammary carcinoma was: 10.5% (19), 3.0% (33), 0% (9), and 0% (7), resp., as compared to 27% in 26 controls; for mammary tumors, 10.5%, 18.1%, 11.1%, and 0%, resp., as compared with 38.5% for controls. The incidence of skin carcinoma (occurring only in males) and of fibrosarcoma was not altered significantly. The incidence of "other cancers" showed no significant change. (See also CRA 2(8):#1448, 1964, and the following abstract.)

65-1362 CONCLUDING COMMENTS ON BIOLOGICAL EFFECTS OF ALPHA-PARTICLE EMITTERS IN SOFT TISSUE AS EXEMPLIFIED BY EXPERIMENTS WITH POLONIUM 210. (E.) Stannard, J. N. (Dept. Radiat. Biol., U. Rochester Sch. Med. Dent., N. Y.) and G. W. Casarett. *Radiat. Res. (Suppl. 5)*:398-434, 1964.

Experiments wherein rats were admin. single i.v. inj. of Po^{210} showed certain premalignant changes occurring in various tissues. A dose-related increase in the incidence of general and tissue specific sarcomas and carcinomas, and increased multiplicity of primary neoplasms were noted in treated animals. In another study, squamous lung carcinoma occurred in 7.5% of 40 male rats which received a single intratracheal inj. of Po^{210} ($4 \mu C/kg$). This was not considered statistically significant inasmuch as sufficient control data was not available for this study, and since monthly i.v. inj. at low doses induced primary lung cancer in 4.6% of 87 male rats in a study where 3.4% of 59 non-treated controls also developed the neoplasm. (See also the preceding abstract.)

- 65-1363 THOROTRAST-INDUCED HEPATIC TUMORS IN THE RAT. (PRELIMINARY OBSERVATIONS). (It.) Grampa, G. (Inst. Path. Anat., U. Milan, Italy) and A. Severini. Boll. Soc. Ital. Pat. 8(1):12-14, 1963-1964.

Intact, white, male Sprague-Dawley rats (2 mo. old; 120-30 g) were treated with ThO_2 (Thorotrast, T; 40 mg i.v.; 50 rats) or carbon (C; 15 mg i.v.; 20 rats). The following results were noted: 1 rat with hepatocellular adenoma 5 mo. after inj. and 3 with hepatocellular hyperplasia among the T rats. Fifty other rats were orchietomized (ORX) and treated with estradiol valerianate (E; 10 mg s.c.) 20 days before admin. of T (30 rats) or 5 days before admin. of C (10 rats). After 3 mo., 9 of the T + ORX rats developed hepatocellular adenomas and after 10-11 mo. 2 developed hepatocellular carcinomas. In the C + ORX group 1 developed a cholangio-cellular adenoma after 7 mo. It is concluded that the carcinogenic effect of T is due to its radioactivity and that this effect is enhanced in animals treated by ORX and E.

- 65-1364 A RARE CASE OF OSTEOGENIC SARCOMA. (Hun.) Léb, J. and L. Dömötör. Magy. Radiol. 17(1):13-17, 1965.

- 65-1365 MENINGIOMA DEVELOPED IN A CHILD AFTER X-RAY TREATMENT. (Hun.) Horányi, B. Magy. Radiol. 17(1):1-7, 1965.

- 65-1366 TUMORS WHICH DEVELOPED AFTER THE RADIATION TREATMENT OF BENIGN GROWTHS.

(Hun.) Vándor, F. and L. Ravasz. Magy. Radiol. 17(1):8-12, 1965.

- 65-1367 A CASE OF ACUTE LEUKEMIA JUDGED AS A SEQUELA OF THOROTRAST INJECTION. (Jap., Abstract) Imai, H. (Dept. Intern. Med. Nakadori Hosp., Akita City, Japan). Nippon Naika Gakkai Zasshi (J. Jap. Soc. Intern. Med.) 53(4):492, 1964.

- 65-1368 MORPHOLOGIC DEMONSTRATION OF RECURRENT TUMOR FOLLOWING X-IRRADIATION. HISTOLOGIC STUDY OF IRRADIATED MURINE CHONDROSARCO TRANSPLANTS. (E.) Swarm, R. L. (NCI, Bethesda). J. N. Correa, J. R. Andrews and E. Miller. J. Nat. Cancer Inst. 33(4):657-672, 1964.

- 65-1369 A CASE OF SQUAMOUS CELL CARCINOMA CAUSED BY GRENZ-RAY IRRADIATION. (Jap.) Ohkido, M. (Dept. Derm., Keio U. Sch. Med., Japan) and Y. Horiuchi. Rinsho Hifu Hinyokika (Clin. Derm. Urol., Tokyo) 19(3):315-318, 1965.

- 65-1370 ANGIOPLASTIC SARCOMA AFTER IRRADIATION OF CARCINOMA OF THE CERVIX UTERI. (Ger., Abstract) Gertler. Derm. Wschr. 151(3):66, 1965.

- 65-1371 A CASE OF ACUTE MYELOID LEUKEMIA OCCURRING AFTER I^{131} THERAPY FOR HYPERTHYROIDISM. (Jap.) Yoshikawa, N. (Tango Cent. Hosp., Kyoto Pref., Japan), K. Torizuka, N. Ito, A. Imura, M. Koshiyama, T. Eguchi, S. Komuro, T. Hikabe, M. Inada, K. Nakaya, S. Hamada, T. K. Shirasaki and T. Miyake. Horumon To Rinsho (Clin. Endocr.) 10(12):958-960, 1962.

A case report.

- 65-1372 THE ROLE OF ASBESTOSIS IN THE GENESIS OF PLEURAL MESOTHELIOMA. (Fr.) Turiaf, J. Sem. Hop. Paris 41(17):738, 1965.

A case report.

- 65-1373 URETHANE AND X-RADIATION STUDIES ON INHERENTLY TUMOR-RESISTANT MICE. (E., Abstract) Goldfeder, A. (Dept. Hosp., New York U., N. Y.) and S. Kauffman. Proc. Am. Assn. Cancer Res. 6:22, 1965.

See also abstract nos.: 1313, 1330, 1331, 1332, 1409, 1554, 1567, 1584, 1590

CHEMICAL CARCINOGENESIS

374 SUSCEPTIBILITY OF SYRIAN HAMSTERS TO INDUCTION OF FIBROSARCOMAS WITH A SUBCUTANEOUS INJECTION OF 3,4,9,10-DIBENZOPYRENE. (E.) Helinski, I. (Arthur D. Little, Inc., Cambridge, Mass.), A. Helinski and C. J. Kensler. *Nature (London)* 203:308-309, 1964.

3,4,9,10-Dibenzopyrene (DBP; 0.25-2 mg in Triolein) was admin. in a single s.c. inj. to Syrian hamsters (55-75 g). At the highest dose, all animals died before the appearance of the first tumor. In animals developing tumors, microscopic sections revealed typical fibrosarcomas in the subcutis with fairly uniform histologic pattern. In effective groups of 6-10 hamsters, tumor incidences were 100%, 100%, 90% and 55%, respectively; av. latent periods (wk.) were 9.8, 10.2, 11.0 and 14.0, resp. In a second experiment with a dose of 1.0 mg DBP, in 157 female and 139 male hamsters, tumor incidences were 100% and 99%, respectively; av. latency was 11.0 and 11.6 wk., resp. Tumors developed in 10 hamsters given the solvent (Triolein) alone.

375 MALIGNANT DEGENERATION OF EXPERIMENTAL PULMONARY ADENOMA INDUCED BY URETHAN IN THE SWISS MOUSE. II. ELECTRON MICROSCOPE HISTOLOGICAL STUDY. (Fr.) Driessens, J. (Cancer Inst., Lille, France), E. Dupont, A. Demaille and E. Puvion. *C. R. Acad. Sci. (Paris)* 273(4): 158(4): 158-160, 1964.

Additional data supplements two previously published reports (see CRA 1(2):#233, 1963; and CRA 1(9-10):1684, 1964). Electron microscope examination revealed after the 25th wk. the presence in the tumor cells of many indications of malignant transformation. These findings confirm the results of histological studies (see CRA 1(9-10):#1685, 1964).

376 TARS AND NICOTINE IN CIGARETTE SMOKE. (Sw.) Cederlof, R. (Dept. Hygiene, Karolinska Inst., Stockholm, Sweden), and M. L. Gustafsson. *Nord. Hyg. T.* 45(2):83-88, 1964.

Smoke of the 15 most popular brands of unfiltered cigarettes sold in Sweden was analyzed for tar content; results (mg/cigarette) were as follows (number of brands analyzed in parentheses): "moderate" size (1)--22.2; regular size (9)--25.9-33.8; king size (5)--39.2-41.8. Tar content, as above, for 1 regular size, 10 king and 10 king-sized filter cigarettes was: 17.0-25.4; 19.7-35.9, resp. A number of other brands were included in the study. Methods of analysis are described in some detail.

377 ENZYMATIC STUDIES OF CANCER. (Nor.) Fritzson, P. (Norwegian Inst. Cancer

Res., Montebello, Oslo). *Nord. Med.* 72(36): 1037-1041, 1964.

A general review (22 references) is accompanied by report of an experiment in which a diet containing 0.05% acetylaminofluorene (AAF) was fed to rats. Hepatic dihydrouracil dehydrogenase (DHU) activity was reduced by approx. 50% in the course of 30 days, and remained essentially stable at that level until AAF was withdrawn on day 90. Hepatic DHU activity/100 g rat returned to control levels (or slightly above these) over the following 30 days. Activity/mg protein returned to >90% of control levels over the same period. Similar, but less marked, effects were exerted on dihydrouracil hydrazase activity and that of β -ureidopropionic acid decarbamylase, confirming the presence of a mechanism of action which directly affected the liver's ability to degrade uracil.

65-1378 POLLUTION BY POLYAROMATIC HYDROCARBONS OF THE 3,4-BENZOPYRENE TYPE IN PLANKTON OF THE BAY OF VILLEFRANCHE (ALPES-MARITIMES). (Fr.) Mallet, L. (Municip. Lab. Prefect. Police, Villefrance-sur-Mer, France) and J. Sardou. *C. R. Acad. Sci. (Paris)* 258(21)(Group. 12): 5264-5267, 1964.

Analysis of plankton specimens collected in the bay of Villefranche from November 1962 to June 1963 revealed contamination by 3,4-benzopyrene (BP); the greatest amounts were found at the entrance of the bay (up to 40 μ g/100 g). The degree of plankton pollution did not correspond to the contamination of the sediments in the bay bottom; in zones where the sediment pollution was particularly abundant, plankton specimens contained only 1.2 μ g of BP/100 g. The existence of pollution factors other than sediment contaminants are therefore believed to be involved. (See also CRA 1(6):#1062; *ibid.*, (8):#1493, 1963; and *ibid.*, 2(5):#882, 1964.)

65-1379 THE INDUCTION OF TUMORS IN INSECTS BY TUMOR NUCLEIC ACID EXTRACT. (Fr.) Matz, G. (Lab. Gen. Biol., U. Strasbourg Sch. Med., France), J.-H. Weil, P. Joly and J.-P. Ebel. *C. R. Acad. Sci. (Paris)* 258(17)(Group. 12): 4366-4368, 1964.

When young imagoes of *Locusta migratoria* L. were inoc. into the hemolymphatic cavity with nucleic acid extracts of tumors of the digestive tract of the same insect, 29/128 (22.7%) developed one or several tumors of the digestive tract, mucous glands and oviducts in 12 days; only 2/48 insects inj. with nucleic acid extracts from the digestive tracts of healthy insects developed tumors. Heated extracts (100°) resulted in fewer tumors (7.4%). The tumor-inducing activity of the tumor nucleic acid extracts persisted after treatment with DNase but was completely abolished

by RNase. Yeast RNA did not induce any tumors in these insects. It is suggested that the infective RNA might have a viral nature. Preliminary studies with the electron microscope have in fact revealed the presence of virus-like particles in some tumor cells.

- 65-1380 STUDY OF CARCINOGENIC AROMATIC AMINES AS HAPTENS. (Rus.) Korosteleva, T. A. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) and A. P. Skachkov. Vop. Onkol. 10(10):72-78, 1964.

Azo proteins were prepared from total human serum proteins, human serum globulins and albumins, horse serum proteins and bovine albumins. Rabbits were immunized with azo proteins. Antisera against synthetic azo proteins were obtained, containing the carcinogen β -naphthylamine. The precipitins which could be produced by such antigens in the rabbit are directed against the β -naphthylamine group. Likewise, azo proteins containing α -naphthylamine were synthesized, and they also possess structural specificity. In the cross precipitation reactions immunological relationship was proved between β -naphthylamine and its non-carcinogenic isomer α -naphthylamine.

- 65-1381 ANTIGENIC CHARACTERISTICS OF HEPATOMAS INDUCED IN RATS BY N-NITROSODIETHYLAMINE. (Rus.) Fel', V. Ia. (Dept. Cytol., Cytol. Acad. Med. Sci. USSR, Leningrad), T. N. Tsikarishvili and I. N. Shvemberger. Vop. Onkol. 10(9):66-69, 1964.

N-Nitrosodiethylamine (NEA; 0.5-1.5 mg/dose x 5/wk. for 12-28 wk., total 40-75 mg; intragastric) induced, within an av. of 40 wk., hepatocellular tumors in random-bred rats. For the antigenic studies 14 primary hepatomas and one first generation tumor were studied. An aqueous-saline extract of rat liver yielded 5 organ-specific antigens when studied by means of the agar precipitation reaction. NEA-induced hepatocellular tumors were characterized, as a rule, by the loss of 3 or 4 of these antigens. In various tumors different antigens were involved. A correlation between the antigenic characteristics of single tumors and their dedifferentiation was found; slightly differentiated hepatomas showed a greater loss of organ-specific antigens than the less dedifferentiated ones.

- 65-1382 CHANGES IN SUSCEPTIBILITY TO URETHANE-INDUCED LUNG TUMOURS PRODUCED BY SELECTIVE BREEDING IN MICE. (E.) Falconer, D. S. (Inst. Anim. Genet., U. Edinburgh, Great Britain) and J. L. Bloom. Brit. J. Cancer 18(2):322-332, 1964.

Urethan (U) was admin. to various strains of mice to determine susceptibility to lung tumors. Fixed

doses of U were admin. to all mice: 2 i.p. inj. of a 10% soln., 0.1 ml at 3 wk. of age and 0.28 ml at 9 wk. After 9 generations of selection in the heterogeneous strain LX, the mean tumor number increased to 26.8 (from 7.0 in the unselected strain). This exceeded the av. number (23.7) in the most susceptible inbred strain, strain 1. In selection for decreased tumor number carried out for 6 generations, the mean tumor number was limited to 1.5; the av. number in the least susceptible inbred strain available (C57BL) was 0.91. The rate of response to the selection agreed with the predictions based on the previously estimated heritability of 54.5%.

- 65-1383 THE PROTECTIVE EFFECT OF ISOGENIC BONE MARROW UPON THE ACUTE DAMAGE PRODUCED BY THE ADMINISTRATION OF 9,10-DIMETHYL-1,2-BENZANTHRACENE (DMBA) TO NEWBORN C3Hf/Gs MICE. (I) Chieco-Bianchi, L. (Inst. Anat. Histol. Path., U. Bari, Italy), G. Tridente, G. De Benedictis and L. Fiore-Donati. Boll. Soc. Ital. Biol. 40(15):939-942, 1964.

In inbred C3Hf/Gs mice treated at birth s.c. with 30 μ g of DMBA in olive oil, the i.p. inoc. of 50×10^6 bone marrow cells from healthy male donors of the same strain on day 11 following DMBA admin. increased the 30-day survival to 40% (25/39) as compared with 22% (8/36) in non-protected animals. Toxic symptoms were less marked in protected mice. Most dead animals showed spleen and thymus atrophy. No conclusions could be drawn as to the nature of the protective mechanism.

- 65-1384 ASSAY OF PARAFFINS AND MICROCRYSTALLINE WAXES FOR CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS. SECOND REPORT. (Ger.) Helberg, D. (Dept. Food Chem., Max v. Pettenk Inst., Berlin). Deutsch. Lebensmittelrundschr. 60(11):345-347, 1964.

Assay technics for the identification and determination of polycyclic hydrocarbons (PHC) are presented in detail. PHC from microcrystalline waxes, "coating" waxes and paraffins were converted with nitromethane, separated by chromatography, eluted with cyclohexane and determined by absorption spectrum (AS) and fluorescence (F) analysis. With AS the sensitivity for 3,4-benzpyrene, 1,2,5,6-dibenzanthracene or 20-methylcholanthrene was 0.3 ppm; with F, it was 0.05 ppm for 3,4-benzpyrene. Antioxidants, butylated hydroxyanisole and butylated hydroxytoluene could be detected in microcrystalline waxes and paraffins by 2,6-dichloroquinone chlorimide.

- 65-1385 LEUKEMOGENIC AND ANTILEUKEMIC EFFECT OF INDOLE. (Rus.) Felistovich, G. I. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) Vop. Onkol. 10(9):70-73, 1964.

le (1; 10 mg/kg x 1/wk. for 3 mo.) was inj. into 2, 3 or 7-8-month-old mice, strain Afb. 6, 7-8-month-old mice, 12 developed leukemia within 3 mo. and died on day 30-75 after treatment; 11 were myeloid, 1 was re-ar. Minimal and max. total doses needed 30 and 120 mg/kg. After 3 mo. of observation only 4/16 controls developed L; however later 7/16 showed spontaneous L (5/7 lymphoid). Of 70 mice, treated at age 2 mo., L developed in 9 as compared to 27/70 controls. Mice treated at age 3 mo., incidence was 10 (controls 34/100). In controls L mostly developed at age 6-11 mo. as compared to yr. 2 treated mice. Apparently, L, which developed 6-7 mo. after discontinuation of I, was not of (myeloid type) but was spontaneous (myeloid type). Therefore, depending on age, delayed development of L and increased percentage of mice with L, or delayed L formation.

86 CUTANEOUS CANCER IN CHRONIC ARSENIC INTOXICATION AMONG WINEGROWERS IN POLAND. (Fr., Ph. D Thesis, U. Lyon, 1964, p.). Castel, L. Reviewed in Lyon Med. 151(3-4):740-741, 1964.

Cases are presented of winegrowers with multipitheiomatosis due to arsenic exposure. Complication developed 15-20 yr. after the beginning of the intoxication.

87 EXPERIMENTAL TUMORS OF THE UROGENITAL SYSTEM. (E.) Wojewski, A. (Clin. Pomeranian Med. Acad., Szczecin, Poland), Masón, R. Roessler and A. Laska. J. Urol. 151(3-4):568-573, 1964.

CRA 2(4):#676; ibid., 2(7):#1259, 1964; and 3(4):#745, 1965.

88 A NEW CASE OF HISTIOMONOCYTIC RETICULOSIS DUE TO BENZENE. (Sp.) Aguirre, M. Nuestra Señora de la Concepcion, Madrid, M. Morales, F. J. Sanz Martin, Sanchez Fayos and J. A. Torres. Rev. Clin. 194(3):229-231, 1964.

A case similar to the two described in CRA 2(5): 1964, is presented by the authors. A 62-year-old man (shoemaker by trade) died of malignant reticulosis with leukemic aspects after exposure to benzene for 10 yr.

89 THEORETICAL BASES FOR THE PROPHYLAXIS AND TREATMENT OF DYSHORMONAL TUMORS. Lazarev, N. I., Moscow, Medgiz, 1963, p. Reviewed in Probl. Endokr. Gormonoter. 117-118, 1964, by I. Tereshchenko and Melov.

ev discusses "Hormones and tumor development"

and includes under "dys hormonal tumors" (DT; those which appeared and developed as a result of a prolonged disturbance of hormonal balance in the organism) hypophyseal, thyroid, pancreatic, adrenal, etc., tumors. Further data on the carcinogenic effect of exogenous and endogenous hormones, conditions necessary for the development of DT, hormonal effects on the mammary gland during the menstrual cycle and pregnancy, and hypotheses on the causes for tumor development are discussed. In the part II "Hormonal role in the tumor development", experimental data and clinical observations are presented. In a section of part III "Theoretical bases for the prophylaxis of dys hormonal tumors" the author analyzes mastopathy as a precancerous lesion.

65-1390 THE IN VIVO EFFECTS OF CORTISOL ON PROTEIN METABOLISM IN NORMAL AND MALIGNANT TISSUES. (E.) De Loecker, W. (Vesalius Inst., U. Louvain, Belgium). Arch. Int. Pharmacodyn. 151(3-4):418-428, 1964.

Male albino Wistar R. rats (wt. 150-180 g) received 3'-methyl-4-dimethylaminoazobenzene incorporated into a protein-deficient diet. This diet was continued for 4 mo., then normal food was admin. for 1 mo. The rats manifested several hepatoma nodules. At the end of mo. 5, the rats received cortisol, 1-10 mg/day x 3 i.m.; at the time of the last inj. of cortisol they received an i.p. tracer dose of glycine-2- C^{14} . When sacrificed 6-24 hr. later, there were no marked changes in protein conc. in precancerous liver and hepatoma tissue nor in skeletal muscle. The incorporation of glycine into the proteins of normal liver was markedly stimulated by cortisol, but only slight stimulation was obtained in the precancerous, cirrhotic liver of hepatoma-bearing animals. The hepatoma nodules showed a spontaneous incorporation which was higher than that of normal, cortisol-stimulated liver. Cortisol treatment, however, reduced the glycine incorporation into hepatoma by up to 42%.

65-1391 FACTORS INFLUENCING GLUCOSE-6-PHOSPHATASE ACTIVITY IN THE LIVER IN TRANSPLANTABLE CHRYSOIDIN HEPATOMA IN MICE. (E.) Orłowska, J. (Dept. Exp. Oncol., Inst. Immunol. Exp. Ther., Polish Acad. Sci., Wrocław). Arch. Immun. Ther. Exp. 12(5):571-577, 1964.

C57Bl and F₁(C57Bl x RII) mice, normal or with transplanted chrysoidin hepatoma were used for comparison of reactions of normal liver and hepatoma to various stimuli. Fasting (24 hr.) caused a 55% increase (av.) in the glucose-6-phosphatase (GPase) activity of hepatoma-bearing mice. The greater degree of enzymatic adaptation found in the liver of mice with tumor may be a manifestation of the greater glucose requirement of the organism harboring a tumor. GPase activity in hepatoma did not differ significantly from that in normal liver. Alloxan induced diabetes increased GPase activity by 70% in the liver of

normal and tumor bearing mice, but had no effect on the enzyme's activity in the hepatoma itself. Cortisone, 0.5 mg s.c. increased GPase activity of normal liver by 28%, somewhat more in the liver of mice with transplanted tumor, and by 50% in the hepatoma.

- 65-1392 ULTRASTRUCTURAL ALTERATIONS IN HAMSTER CHEEK POUCH EPITHELIUM IN RESPONSE TO A CARCINOGEN. (E.) Listgarten, M. A. (Dept. Oral Histopath., Harvard Sch. Dent. Med., Boston, Mass.), J. T. Albright and P. Goldhaber. *Arch. Oral Biol.* 8(2):145-165, 1963.

A marked disturbance in the intercellular relationship of epithelial cells in hamster cheek pouch was produced by applications of 7,12-dimethylbenzanthracene or a non-carcinogenic irritant, xylene. Such disturbances (widening of the intercellular spaces, desmosomal disruption, peripheral clumping of tonofibrils) may facilitate the penetration of a carcinogen to the stratum germinativum and the underlying connective tissue.

- 65-1393 THE APPLICATION OF ACRIDINE ORANGE FLUORESCENCE MICROSCOPY TO EXPERIMENTAL CARCINOMA OF THE UTERINE CERVIX IN MICE. (E.) Stevenson, J. L. (Dept. Path., Ohio State U., Columbus) and E. Von Haam. *Acta Cytol. (Phila.)* 8(6):403-407, 1964.

In 30 DBA mice, cotton sutures (3-0) impregnated with 20-methylcholanthrene were inserted through the endocervical canal and the left horn of the uterus, brought through the ventral abdominal wall, and fixed s.c. Unimpregnated sutures were also inserted in 20 controls. By the 16th wk., nearly all the experimental mice produced smears which were considered positive by the acridine orange fluorescence method, which proved similar in accuracy to the Papanicolaou method. Histologically, there were 25 invasive carcinomas, 3 carcinomas *in situ* and 1 dysplasia. All controls were negative. (See also CRA 1(3):#436; and *ibid.*, 1(5):#820, 1963.)

- 65-1394 SELECTIVE INDUCTION OF BLADDER CANCER IN RATS BY DIBUTYL- AND N-BUTYL-N-BUTANOL(4)-NITROSAMINE. (Ger.) Druckrey, H. (Dept. Surg., U. Freiburg i. Br., Germany), R. Preussmann, S. Ivankovic, C. H. Schmidt, H. D. Mennel and K. W. Stahl. *Zschr. Krebsforsch.* 66(4):280-290, 1964.

Dibutyl nitrosamine (DBN; 200 or 400 mg/kg, s.c., total 7.4 or 9.3 g/kg, resp.) caused bladder carcinoma in all 18 evaluable rats (Strain BDII) after an av. of 334 or 208 days, resp. Esophageal carcinoma was seen in 3, liver carcinoma in 2. Presumably this organotropic effect is due to the hydroxylation of a terminal butyl group. Unchanged DBN was not detected in the urine following an inj. of 1000 mg DBN but several water soluble metabolites with nitrosamine-like

structure were found. Their conc. was 10-100 times higher in urine than in blood or serum. 25 rats (males, females; strain BDVI, VIII and IX) treated with butyl-butanol(4)-nitrosamine (BBN; 20 or 40 mg/kg/day in drinking water; av. total 5.4 or 9.2 g/kg) developed bladder carcinomas after an av. of 275 or 225 days, resp. Histological examination showed squamous epithelium-, adeno- or transitional cell carcinoma. The synthesis of BBN and its chemical and physical properties are presented.

- 65-1395 THE CARCINOGENIC EFFECT OF TOBACCO SMOKE CONDENSATES IN RATS: COMPARATIVE STUDY OF SUBCUTANEOUS AND ORAL ADMINISTRATION. (Ger.) Schmähel, D. (Inst. Path., U. Bonn, Germany) and C. Thomas. *Zschr. Krebsforsch.* 66(4):291-296, 1964.

Tobacco smoke condensates (TSC; which contained an av. of 5.36% nicotine, 0.59 µg/g of 1,2-benzopyrene and 1.09 µg/g of 3,4-benzopyrene (condensate yield = 4.32%)) were dissolved in tricapric acid + 70% ethanol and then admin. s.c. or p.o. (50 µl x 1/wk.) to 3-month-old male and female albino rats. Of 76 rats inj. s.c. (total 3.9 g), 21 (27.5%) developed local sarcomas (polymorphous, fibro-, fibromyx-, fibrolipo-). The av. induction period was 22 ± 1 mo. Among 57 rats treated p.o. (total 4.4 g) and 81 controls (inj. s.c. with solvents alone), no tumors developed. The prolonged treatment with high nicotine dose had no marked effect on the av. life expectancy. Histologic findings of early and late changes are discussed in some detail. The carcinogenic effect of TSC was strictly localized.

- 65-1396 CARCINOGENIC ACTIVITY OF SUBSTITUTE DERIVATIVES OF 1,2:3,4-DIBENZOPYRENE 1,2:4,5-DIBENZOPYRENE AND 1,2:4,5:8,9-TRIBENZOPYRENE. (Fr.) Lacassagne, A. (Radium Inst., Paris), Buu-Hoi, F. Zajdela and D. Lavit-Lamy. *C. R. Acad. Sci.* 259(21) (Group. 14):3899-3902, 1964.

Male and female mice, strain XVII nc/Z, were inj. s.c. at monthly intervals with each of 5 derivatives of two dibenzopyrenes (DBP) and one tribenzopyrene (TBP) (0.6 mg x 3 in 0.2 ml sterile olive oil). 1,2,3,4-DBP induced sarcomas in 12/14 males and in 12/14 females with a mean latency of 144 and 179 days, resp.; comparable figures for 5-formyl-1,2,3,4-DBP were 1/7, 2/7, 300, and for 5-methyl-1,2,3,4-DBP 4/7, 8/8, 162, 1,2,4,5-DBP induced sarcomas in 18/21 males and 14/14 females with a mean latency of 112 and 144 days, resp.; comparable figures for 2'-methyl-1,2,4,5-DBP were 5/8, 6/7, 215, 263, and for 3'-methyl-1,2,4,5-DBP 3/8, 5/8, 374, 341. 1,2,4,5,8,9-TBP induced sarcomas in 3/8 males and 6/19 females with a mean latency of 274 and 300 days, resp.; comparable figures for 2'-methyl-1,2,4,5,8,9-TBP were 3/8, 1/8, 396, 330. It is concluded that the introduction of an aldehyde group in position 5 reduces the carcinogenicity.

activity of 1,2,3,4-DBP much more than methylation at the same position. Similarly, the carcinogenic activity of 1,2,4,5-DBP is reduced by methylation of positions 2 and 3, while for TBP derivatives, methylation at position 2 reduces carcinogenic activity only in females.

397 STUDIES WITH CYCAD. (E.) Mickelsen, O. (Dept. Food Nutr., Michigan State U., Lansing), E. Campbell, M. Yang, G. Muger, C. K. Whitehair. Fed. Proc. 23(6)(Pt. 1):1365, 1964.

Acute toxicity studies in various animals, the feeding of cycad meal prepared from unwashed seeds of Cycas circinalis or the glycoside cycasin produced macroscopically visible neoplasms of the liver, kidney, or colon in 30/50 rats that died or were moribund at time of sacrifice. Controls showed no such lesions at necropsy. The toxicity showed varied toxicity over 18 mo.; it was destroyed by heat. Washed cycad meal did not induce neoplasms or other lesions. (See also 2(6):#1114, 1964.)

398 EFFECTS OF CYCASIN AND CYCAD MEAL. (E.) Levene, C. I. (Dept. Path., Chicago, Ill.), S. Duban and R. H. Hughes. Proc. 23(6)(Pt. 1):1366-1367, 1964.

Guinea pigs (wt. 300 g) fed a crude meal of ground fresh cycad nuts (2.5, 5 or 10%), died in the first month a mortality (33/60) only proportional to the amount of cycad meal in their diet. After 2-6 mo. there were liver lesions, but no malignancy.

399 CYCAD TOXICITY IN MONKEYS: CLINICAL, PATHOLOGICAL, AND BIOCHEMICAL ASPECTS. Dastur, D. K. (Neuropath. Unit, Post-Grad. Lab., Bombay, India). Fed. Proc. 23(6)(Pt. 1):1368-1369, 1964.

Acute toxicity study with 3 rhesus monkeys, up to 14 mo. baked wheat or millet pancakes (200 g/day) containing 1-4 g/day of stored flour made from washed Cycas circinalis seeds, showed some clinico-pathologic symptoms but no malignancy. Two types of flour were used: one made in Guam had no detectable cycasin but the other made in the author's laboratory contained cycasin.

400 TOXIC FUNGI FROM THE SEEDS OF CYCAS CIRCINALIS L. (E.) Forgacs, J. (Samaritan Hosp., Suffern, N. Y.) and W. T. L. Fed. Proc. 23(6)(Pt. 1):1370-1372, 1964.

Culture media of several fungi isolated from seeds of Cycas circinalis were fed to Swiss-Webster mice. Those from Aspergillus flavus, A. niger, Marasmius, Curvularia lunata and the Macrosporium

species were toxic to mice. Gross necropsy revealed tumor-like small gray lesions in some livers, hemorrhage and congestion in most tissues and splenic hypertrophy. Controls were normal. Of the various fungi tried, A. flavus was most toxic; death occurred in 3/5 mice in 7 days. The strain of A. flavus used has been shown by others to produce a high titer of aflatoxin.

65-1401 METHYLZOXYMETHANOL, THE AGLYCONE OF CYCASIN. (E.) Kobayashi, A. (Dept. Agric. Biochem., U. Hawaii, Honolulu) and H. Matsumoto. Fed. Proc. 23(6)(Pt. 1):1354-1356, 1964.

Rats force fed 45 or 50 mg of cycasin (derived from Cycas circinalis seeds) were found to excrete the bulk of the compound within 12 hr., a smaller quantity in the next 12 hr., and traces thereafter. Toxic symptoms were noted in these animals for 2-3 days with recovery thereafter. No signs of toxicity, but a similar pattern of urinary excretion, were noted in rats inj. i.p. with cycasin. However, marked toxic symptoms or death occurred in rats inj. i.p. with the aglycone of cycasin, methylzoxymethanol (MAM; 11-143 mg/kg in graded doses) or MAM-acetate (21-86 mg/kg). The data indicate that MAM, and not cycasin per se, is the toxic constituent of C. circinalis. The methods of preparation for MAM and MAM-acetate are described in detail.

65-1402 STUDIES ON THE STAGES OF CHEMICAL CARCINOGENESIS. (E.) Melczer, N. (Dept. Derm., Med. U. Pecs, Hungary) and M. Hamar. Oncologia (Basel) 18(3):195-209, 1964.

The subsequent part of the initiating and the first part of the promoting stage of carcinogenesis were studied in 9 groups of inbred P-strain mice (20 per group; both sexes) which were painted on the dorsal interscapular region with benzpyrene (BP; 0.5% in benzene, 2x/wk. for 4-12 wk.). Protein was stained by means of the fluorescent dye technic. After 10-12 wk. of BP treatment there was complete, irreversible loss of fluorescence, i.e., there was progressive gradual malignant transformation. A weak fluorescence reappeared in the corium even after 12 wk. of treatment. In animals treated 7-8 wk., the epidermal regeneration was delayed and incomplete, and occurred only in some of the mice. Discontinuation of treatment after 4-6 wk. led to the reappearance of fluorescence; after 7-8 wk. of BP, there was only partial reappearance of fluorescence. These results indicate that the primary process consists of the malignant transformation of the epidermis. (See also CRA 2(2):#210, 1964.)

65-1403 CHANGES IN THE IMMUNOLOGICAL STATE OF THE BODY DURING THE ACTION OF CARCINOGENIC CHEMICAL AGENTS. (E.) Shapiro, D. D. (Ukrainian Sci. Res. Inst. Indust. Hygiene,

Kharkov) and I. Ia. Getmanets. Bull. Exp. Biol. Med. (Eng.) 57(2):213-216, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 57(2):93-97, 1964. See CRA 2(5):#875, 1964.

65-1404 A STUDY OF THE SIMPLIFIED ANTIGENIC STRUCTURE OF THE MOUSE LIVER DURING EARLY STAGES OF CARCINOGENESIS CARRIED OUT WITH THE AID OF ANALYTICAL IMMUNOELECTROPHORESIS. (E.) Gel'shtein, V. I. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow) and T. A. Iagorskaya. Bull. Exp. Biol. Med. (Eng.) 57(2):209-212, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 57(2):90-93, 1964. See CRA 2(3):#499, 1964.

65-1405 EXPERIMENTAL TUMORS OF THE PENIS. (E.) Shabad, A. L. (Urol. Clin., Central Inst. Postgrad. Med., Moscow). Bull. Exp. Biol. Med. (Eng.) 56(12):1362-1366, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 56(12):73-78, 1963. See CRA 2(3):#458, 1964.

65-1406 CHEMOPROPHYLAXIS OF CHEMICAL CARCINOGENESIS. (E.) Wattenberg, L. W. (Dept. Path., U. Minnesota, Minneapolis). Univ. Minn. Med. Bull. 36(5):178-180, 1965.

Phenothiazine, chlorpromazine HCl, and pyrazine HCl (which are potent inducers of an increase in benzpyrene hydroxylase activity) completely protected against 9,10-dimethyl-1,2-benzanthracene (DMBA)-induced adrenal necrosis when admin. p.o. to 50-day-old female Sprague Dawley rats 48 hr. prior to the p.o. admin. of DMBA. Methyl-(10-phenothiazine) propionate which is inactive as a hydroxylase inducer also fails to protect against the necrosis. Appraisal of the toxicity of phenothiazine and its derivatives indicates that they are not safe enough for general use as potentiators of the carcinogen detoxifying systems in humans.

65-1407 AGE AND SEX FACTORS IN EXPERIMENTAL BRAIN TUMORS. (E.) Perese, D. M. (Dept. Neurosurg., State U. New York, Buffalo). Surg. Forum 15:429-431, 1964.

Statistics indicate a higher mortality in male (M) pts. with glioblastoma multiforme (GM) than in female (F) pts. at the ages of 36-65. Age and sex factors were therefore investigated in 1,000 C3H mice in which brain tumors were induced with methylcholanthrene pellets. Groups of 100 males and 100 females were treated at ages 6 wk., 3, 6 and 9 mo. and 1 yr. Among the gliomas, the incidence of GM (M and F) was,

resp.: 18, 20; 18, 18; 16, 15; 12, 11; and 9, 9. The remaining glioma tumors in each group were astrocytomas, medulloblastomas, oligodendroglioma, ependymoma, and spongioblastoma.

65-1408 STUDIES ON THE METABOLISM OF LIVER CARCINOMAS INDUCED BY p-DIMETHYLAMINOAZOBENZENE. I. EFFECT OF DIETARY RIBOFLAVIN ON CLEAVAGE OF p-DIMETHYLAMINOAZOBENZENE BY NORMAL AND FATTY LIVER OF RAT. (E.) Cheng, H.-W. (Dept. Biochem., Nat. Taiwan U. Coll. Med., Taipei, China) and T. C. Tung. J. Formosa. Med. Assn. 63(7):309-317, 1964.

Liver homogenates of mature Long Evans strain rats (both sexes; 150-250 g) maintained for 1 mo. on a low riboflavin diet (LRD; 1.0 mg/kg of basal diet) showed decreased p-dimethylaminobenzene (DAB) cleavage activity as compared to those of rats fed a high riboflavin diet (HRD; 10 mg/kg basal diet). Addition of FAD largely restored the enzymic activity of LRD livers but had no significant effect in HRD livers. In another group of rats, a fatty liver was induced by repeated s.c. inj. of CCl₄. The hepatic tissue of these rats showed inhibited DAB cleavage activity. This inhibition increased with the number of inj. of CCl₄. When 0.06% of DAB was added to the diets for a few wk., a decrease in ability for *in vitro* cleavage of DAB was noted in the liver homogenates of both LRD and HRD rats. Addition of TPN or lack of TPN suggested that both were essential factors in reestablishment of hepatic enzyme activity. Simultaneous admin. of DAB and CCl₄ caused additive loss in DAB cleavage activity. When CCl₄ or DAB admin. was discontinued, the HRD group showed a more rapid recovery and restoration of enzymic activity than the LRD group.

65-1409 EXPERIMENTAL LYMPHOSARCOMA. HISTOPATHOLOGY AND HISTOGENESIS IN MOUSE LYMPHOMA. (Jap.) Nishizuka, Y. (Dept. Path., Mie Pref. Coll. Med., Japan) and K. Nakakugi. Saishin Igaku (Mod. Med. Osaka) 19(7):1720-1724, 1964.

A detailed study is reported of various types of lymphoma (thymic, nodular and splenic) both spontaneous and induced, in various strains of mice (AKR, SL, (AKR x SL)F₁, (SL x AKR)F₁, C58, (AKR x A/Jax)F₁, A/Jax x AKR)F₁ and A/Jax; the number of mice reported on, were, resp., 190, 73, 32, 24, 5, 2 and 1). The various pretreatments were X-irradiation 150 r/wk. x 4; estradiol benzoate 10-20 µg/wk. x 20 or synthetic triphenylethylene 90 µg/wk. s.c. for 6 mo.; s.c. transplantation of one-quarter of a thymus from 40-50-day-old AKR mice; cortisone acetate, 1 mg/day, s.c., for 10 days, repeated at 1-month intervals for 10 times. Generally, a radical procedure such as radiation induced the thymic type of lymphoma. From the standpoint of host strains, the more susceptible they were the more frequently they developed thymic type (e.g., C57BL). Estrogen induced

types of lymphomas. Thymus transplantation reduced the incidence of leukemia. The AKR strain which the incidence of the spontaneous thymic lymphoma was high, generally showed more advanced thymic development than that seen in the strain. However, the SL strain showed more advanced lymph follicle growth. In both the spontaneous and induced lymphomas the thymic type developed earliest: av. time 279 and 220 days, respectively. The corresponding periods, resp., were 420 and 420 days for the nodular type and 372 and 364 days for the splenic type. The authors suggested the presence of a close relationship between the development of leukemia and the excessive growth of the thymus and spleen.

10 BLOOD PROTEINS IN p-DIMETHYLAMINOAZO-BENZENE-INDUCED RAT LIVER TUMORS AND THE ADMINISTRATION OF HEPATOCYTOTOXIC AGENTS. (Uk.) Kulyk, H. I. (Ukrainian Res. Inst. Clin. Oncol., Kiev, USSR) and A. I. Bykoriz. *Biokhim. Zh.* 36(4):559-564, 1964.

Rats, 150-180 g, received p-dimethylaminoazobenzene (DAB; 0.06% with food) alone or in combination with rabbit or dog hepatocytotoxic agent (0.001 ml or 0.5 ml i.m.) or DAB + 0.5 ml normal serum. DAB alone decreased total serum proteins 4.5% between wk. 2-16, then, with the appearance of liver tumors (wk. 20-22) it increased to 5.6%. The decrease was predominantly on the expense of albumin; α -globulins were increased. Albumin-globulin ratio decreased to 0.5 of normal values. Hepatotoxic sera given in large doses gave a more pronounced decrease in total proteins and globulin; small doses were insufficient for more drastic protein changes. During the earlier part of the experiment with subsequent return toward normal by the end of the experiment. The interrelation of protein fractions here showed less changes than in the groups which received large doses of serum or DAB alone. The group given large doses of serum (with exception, then stimulation of hepatic function) showed no changes occurred in 80% as compared to 50% in the group receiving DAB alone.

11 HYPERPLASIA OF THE STROMA OF THE CORTEX OF THE OVARY IN CARCINOMA OF THE ENDOMETRIUM. (Sp.) Urgell, J. M. (Dept. Obstet. Gynecol., Santa Cruz Hosp., Barcelona, Spain). *Hosp. S. Cruz (Barc.)* 23(5):563-579, 1963.

A study of 29 pts. (age 49-77 yr.; 10/29 without children) with adenocarcinoma of the endometrium, hyperplasia of the stroma of the cortex of the ovary was seen in 72.4% of the cases. Urinary gonadotropins were increased in 10 cases. A literature review (70 references) included and the following relationship is suggested: the elevated production of gonadotropic hormones over a long period of time may give rise to hyperplasia of the stroma of the cortex of the ovaries; this in turn leads to

production of estrogens, which when added to the estrogens produced by the adrenals (in the absence of progesterone), can cause hyperplasia of the endometrium; this hyperplasia can lead to the development of carcinoma in predisposed pts. by a mechanism that is unknown at the present time.

65-1412 AN ANOMALOUS EFFECT OF ETHIONINE ON RIBONUCLEIC ACID SYNTHESIS. (E.)

Turner, M. K. (Chester Beatty Res. Inst., London, S.W.3) and E. Reid. *Nature (London)* 203:1174-1175, 1964.

Young male albino rats were placed on a 20% protein diet containing 0.25% DL-ethionine. Following sacrifice, a DNA-containing "enzyme aggregate" and a preparation of highly purified nuclei were made from the livers. No bile duct proliferation or rise in DNA/g liver were noted. The recovery of tissue DNA from the enzyme aggregate and the nuclei was similar to that from control preparations. An increase in RNA synthesis occurred in preparations from treated animals. This increase was partially reversible, in some cases, by the addition of ammonium sulfate. By means of C^{14} -orotate inj., it was shown that the increase in RNA synthesis also occurred *in vivo* in treated rats. Preliminary experiments indicated that the ethionine induced increase in RNA synthesis *in vitro* is probably only slightly or not at all affected by puromycin and actinomycin D, whereas these agents do reduce the RNA increase *in vivo*. No definite conclusion could be made on the possibility that increased RNA synthesis is an early step in hepatocarcinogenesis.

65-1413 A STUDY OF THE INTERACTION OF 20-METHYLCHOLANTHRENE AND NUCLEIC ACIDS BY SURFACE PRESSURE. (Fr.) Robert, F. (Res. Ctr. Norm. Cancer. Cells, Villejuif/Seine, France). *J. Chim. Phys.* 60:684-687, 1963.

Studies on surface films obtained with benzene soln. of 20-methylcholanthrene (MC; at different pH and at various conc.) and aqueous soln. of DNA and purine nucleosides revealed the following: the formation of a complex between DNA and MC at the surface of the DNA soln.; the breakdown at the surface of the DNA molecule; the union of a molecule of MC and the tetranucleotide of DNA through the intermediary of purine bases; the incomplete formation of a surface film between MC and guanosine.

65-1414 POTASSIUM AND CANCER. (Fr.) Guerrin, A. *Rev. Path. Comp.* 64:265-271, 1964.

Reviewed is the relationship between cancer mortality and the use of potassium fertilizers, feed and pastures. Preliminary data are given on a statistical study relating cancer mortality to potassium alimentation the conclusion of which will be reported in a subsequent paper.

- 65-1415 ACUTE ALEUKEMIC MYELOSIS DUE TO BENZENE. (It.) Dalla Pria, A. F. (Inst. Path. Anat., Civil Hosp. Treviso, Italy) and L. Oricoli. *Gior. Med. Marca Trevig.* 21(Ser. 2):551-569, 1963.

The case is presented of a 56-year-old man who developed acute aleukemic myelosis due to benzene after spending 16 yr. in a shoe factory as a night watchman.

- 65-1416 SPECIFIC CHARACTERISTICS OF LIVER RESPONSE TO PARTIAL HEPATECTOMY IN MICE EXPOSED TO THE ACTION OF A CARCINOGENIC AMINO-AZO COMPOUND. (Rus) Sarsembaev, M. M. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). *Vestn. Akad. Med. Nauk SSSR* 19(11):30-35, 1964.

Fifteen days after discontinuation of treatment with o-aminoazotoluene (OAT; 1% soln. in benzene every 2 days for 6 wk., topically; Group 1) or benzene (as above; controls), C3HA mice (both sexes, 2-3 mo. old), were subjected to partial hepatectomy (PH) and were sacrificed 2-21 days later. Eleven other mice were treated with OAT only (Group 2) but had no PH. Following PH, 51/79 of Group 1 and 15/54 of controls died. Liver response to PH was significantly suppressed in OAT-treated mice. Morphologically, the regenerative changes were similar after PH and OAT. The mitotic ratio of liver parenchyma cells of Group 1 mice was lower than controls on days 2-3 but higher at later dates.

- 65-1417 5'-NUCLEOTIDASE IN THE SERUM OF NORMAL RATS AND IN RATS BEARING FIBROSARCOMA. (Por.) Assis, W. P. (Oswaldo Cruz Inst., Rio de Janeiro, Brazil), G. G. Villela and L. A. Abreu. *Rev. Brasil. Biol.* 23:147-152, 1963.

Slightly higher values of 5'-nucleotidase (0.3 mg P liberated/100 ml; 1.60 I.U./l) were seen in the serum of Wistar rats bearing 1,2,5,6-dibenzanthracene-induced fibrosarcomas than in that of normal rats (av. 0.23 mg of P liberated/100 ml; 1.22 I.U./l). These values are statistically significant at the 5% level.

- 65-1418 REPRODUCTION OF THE SPECIFIC ANTITUMOR IMMUNITY IN THE ISOLOGOUS SYSTEM. (Rus.) Zil'ber, L. A. (N. F. Gamaleya Inst. Epidemiol., Moscow), O. M. Lezhneva and B. D. Brondz. *Biull. Eksp. Biol. Med.* 58(11):93-99, 1964.

In a study of specific antitumor immunity toward tumors induced in the same inbred strains of mice (C57BL/10Sn, B10.D₂, C3H/Sn, C3H.NB, CC57W, CC57Br and A; males, females), tumors developed in 7 treated with methylcholanthrene (MC) and 2 treated with 9,10-dimethyl-1,2-benzanthracene (DMBA; 0.2-0.5 mg s.c.) 2-4 mo. later. These tumors histologically were polymorphocellular

sarcomas or were related to spindle cell sarcoma. Of a total of 68 immunized mice 41 (60.3%) were resistant toward the inoc. of live tumor cells (10⁴-10⁶) of 6/7 MC isologous tumors. Therefore these tumors possessed an antigen(s) which was (were) absent in the isologous host. Of 84 controls only 7 (8.3%) were "resistant". No resistance could be produced to two DMBA tumors and one spontaneous mammary adenocarcinoma.

- 65-1419 EFFECT OF 3,4-BENZOPYRENE ON THE FIBROBLASTIC DIFFERENTIATION IN MONOLAYER CULTURES. (Rus.) Ivanova, O. Iu. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). *Vestn. Akad. Med. Nauk SSSR* 19(11):28-30, 1964.

In monolayer cultures of fibroblasts of s.c. connective tissue of the rat embryo treated with 3,4-benzopyrene (0.002 mg/ml), a stimulation of acid mucopolysaccharide formation was found. However, the formation of the collagenous fibers remained unchanged. The possible adaptive role of this phenomenon is discussed.

- 65-1420 AUTORADIOGRAPHIC STUDIES DURING THE EXPERIMENTAL DEVELOPMENT OF CARCINOMA OF THE RESPIRATORY TRACT OF THE GOLDEN HAMSTER AFTER TREATMENT WITH DIETHYLNITROSAMINE. (Ger.) Döntenwill, W. (Inst. Path., U. Munich, Germany) and B. Wiebecke. *Zschr. Krebsforsch.* 66(4):321-332, 1964.

In male golden hamsters, papillary hyperplasia (PH) of the tracheal mucosa was induced by diethylnitrosamine (0.4 ml of a 1:250 soln. 2-3x/wk. 14-133 days; s.c., rectally or intragastrically). Some received 2 inj. and were sacrificed 324 d after the last inj. In PH, DNA synthesis was almost exclusively in the basal cell layer. A slight amount of DNA synthesis was also seen in the upper cell layers of metaplasias (M) of the mucous epithelium. After use of H³-thymidine (2.0 µC/g, i.p. 40 min. before sacrifice), lab. index (LI) of bronchial tree M was similar to that of carcinomas (Cm). In mice M, DNA synthesizing cells of the bronchial mucosa were in the basal layer; in proliferating M, they were also in the upper cell layer; their distribution was different in small Cm and chiefly at the periphery in large Cm. H³-LI increased sharply in slight M and did not exceed by proliferating M and Cm. Infiltrative growth was not accompanied by an increase in DNA-synthesizing cells. The organotropic effects of nitrosamines evidently are not related to the proliferation rates of individual tissues. Cm usually appeared in the regions of normal low proliferation rates. An infiltrative growth seldom arises from the tracheal mucosa. After discontinuation of treatment with carcinogen, number of DNA-synthesizing cells was sharply reduced in tracheal PH. (See also CRA 3(3):#481, 1965.)

1421 EXPERIMENTAL INDUCTION OF LUNG CANCER IN RATS WITH 3,4-BENZOPYRENE. (Rus.)
ev, L. N. (Inst. Exp. Clin. Oncol., USSR J. Med. Sci., Moscow). *Vestn. Akad. Med. Nauk* 19(11):41-45, 1964.

Two mixed breed rats (38 females; 14 males) received intratracheally 3,4-benzopyrene (BP; 1 mg/dose x 4-7 at 1 mo. intervals). Two rats per 20 mg showed 2 keratotic squamous cell lung cancer (SLC) as well as some benign and hyperplastic changes of the epithelium. After a total of 5 mg, 9/13 developed SLC and a multicentric culosarcoma. After a total of 30 mg, besides various benign and hyperplastic changes, developed a multicentric hemangioendothelioma. After 35 mg, 20/32 rats developed SLC. Lung cancer was found starting from mo. 5; a few metastases were found in the lymph nodes, liver, adrenal glands and kidneys. For all the 4 groups, the incidence of malignant tumors was 67.3% (52) for rats (71% females, 57.1% males).

1422 ATROPHY OF THE EPIDERMIS AND HAIR FOLLICLES OF ZONES OF THE SKIN SUBJECTED TO CHRONIC IRRITATION BY MEANS OF CROTON OIL IN MICE RECEIVING 3,4-BENZOPYRENE PARENTERALLY. (It.) Zinnari, A. *Minerva Derm.* 38(3-4):545, 1963.

In albino mice (strain SMZ; av. wt. 20 g) after a single i.p. inj. of 3,4-benzopyrene (BP; 1 mg in olive oil, 0.5 ml/mouse) were treated bilaterally with croton oil (CO; 2% in olive oil, 0.1 ml/inj.) intradermally on the back. After inj. of CO the animals presented alopecia, erythema; the epithelium showed cornification and fragility. Histochemical analysis revealed marked reduction in nucleoprotein synthesis. CO was stopped after 16 inj., repair was observed and 2 mo. later the hair had not yet grown completely. Mice treated only with CO showed local reactions. Withdrawal of CO from these mice was followed by rapid re-epithelization; histochemical analysis revealed an increase in nucleoproteins. In BP only controls, cutaneous reactions were observed.

1423 ACTIVITY OF ENZYMES OF DNA METABOLISM IN THE SERUM AND LIVER OF RATS WITH HEPATOMAS. (Fr.) De Recondo, A. M. (Ctr. Norm. Cancer, Villejuif/Seine, France) and Frayssinet, J. *J. Physiol. (Paris)* 56(3):430-431, 1964.

Study of DNA metabolism in hepatectomized rats in rats bearing nutritional or transplanted hepatomas showed that liver compensatory hypertrophy is characterized by an increase of serum DNA polymerase I and especially by hyperactivity of liver DNA polymerase (approx. 10-fold increase as compared with normal adult rats). The process of liver cancerization is accompanied instead by an increase of serum and particularly of hepatic

DNA polymerase I (approx. 5-fold increase), while DNA polymerase is more active only in rapidly growing transplanted hepatomas; serum inhibitor of DNA polymerase I was reduced with subsequent hyperactivity of this enzyme in the serum. (See also the following abstract.)

65-1424 INHIBITION OF LIVER COMPENSATORY HYPERTROPHY IN THE RAT BY *ASPERGILLUS FLAVUS* TOXINS. (Fr.) Frayssinet, C. (Ctr. Norm. Cancer, Villejuif/Seine, France), C. Lafarge, A. M. De Recondo and E. Le Breton. *C. R. Acad. Sci. (Paris)* 259(13)(Group. 12):2143-2146, 1964.

In male WAG rats (120 g) which received 30-60 µg/day of aflatoxin (AF) i.p. for 5 days prior to partial hepatectomy (PH), liver regeneration at 24 hr. was greatly inhibited (8-11% as compared with 32% in controls). Total RNA and protein synthesis appeared strongly decreased; however, nuclear RNA synthesis was reduced only by 50%. DNA was not synthesized and with the higher dose signs of destruction (nuclear pyknosis) were also present. When the admin. of AF was delayed until 24 hr. after PH, regeneration was completely inhibited 24 hr. later. DNA, total RNA and nitrogen levels appeared greatly decreased, indicating an intense catabolism. However, RNA synthesis in the nucleus was not apparently impaired by the intoxication. Histological examination revealed a complete absence of mitoses. The results suggest that AF acts more as an enzymatic inhibitor than as a mitotic poison. Particularly interesting is the continued synthesis of certain fractions of nuclear RNA which could explain how a chronic intoxication might cause cellular changes leading to cancer.

65-1425 PRELIMINARY EXPERIMENTS ON THE ACTIVITY OF 19-NORTESTOSTERONE 17-PHENYLPROPIONATE (nor-TPP) ON BENZOPYRENE TUMORS IN RAT. (It.) Siccardi, A. (Civil Hosp., Sanremo, Italy) and A. Zangara. *Arch. Maragliano Pat. Clin.* 19(5):571-580, 1964.

In 16 male albino rats inj. s.c. on the anterior portion of the thorax with 1 ml of 0.5% benzopyrene (BP) in olive oil, treatment with nor-TPP (25 mg in 250 ml olive oil soln.; 1 ml/wk., s.c.) decreased the tumor incidence to 20% and 33%, resp., in two separate experiments (as compared with 50% and 40%, resp., in 16 rats receiving only BP). Tumors in nor-TPP-treated rats grew slower and reached a smaller size than in controls.

65-1426 STUDY OF CARCINOGENIC POLYCYCLIC MOLECULES BY MEANS OF NUCLEAR MAGNETIC RESONANCE. I. ANALYSIS OF SIX MONOMETHYL DERIVATIVES OF 1,2-BENZANTHRACENE. (Fr.) Durand, P. (Inst. Chem. Natural Sub., Nat. Sci. Res. Ctr., Gif-sur-Yvette, France), J. Parello and N. P. Buu-Hoï. *Bull. Soc. Chim. Franc.* (11):2438-2441, 1963.

The analysis of the nuclear magnetic resonance spectra of 6 methyl derivatives of 1,2-benzanthracene (BA) shows that the introduction of a methyl group in the molecule of a polycyclic aromatic hydrocarbon does not result, with respect to the parent compound (BA), in a significant modification of the chemical displacement of aromatic protons. A slight perturbation was noted only in the case of protons close to a methyl group and was ascribed to a diamagnetic anisotropic effect of the C-C and C-H bonds.

65-1427 CARCINOGENIC EFFECTS OF CYCAD MEAL AND CYCASIN, METHYLAZOXYMETHANOL GLYCOSIDE, IN RATS AND EFFECTS OF CYCASIN IN GERMFREE RATS. (E.) Laqueur, G. L. (NIH, Bethesda). Fed. Proc. 23(6)(Pt. 1):1386-1388, 1964.

Weanling male Osborne-Mendel rats were fed diets containing cycasin (C; 40-100 g) and crude cycad meal at a level of 2.5% for a period of 13 days, while young adult rats of the same strain were fed 100 mg C/100 g or 2.5% cycad meal for 21 days. No tumors developed in rats which died before 8 mo. Autopsy of 34 rats (among 106/220 which survived 8 mo.) revealed renal tumors in 32/35 (15 were nephroblastomas). Hepatomas occurred in 2; in addition bile duct adenomas developed in 2 animals. Scattered small aggregates of liver cells devoid of intracellular glycogen and having dense basophilic cytoplasmic material were noted in the liver of many rats. Eight tumors developed in the large intestine; 3/8 were mucosal adenocarcinomas. None of the control rats showed any neoplasms. In a subsequent experiment, germfree or conventional or ex-germfree weanling rats were fed a diet containing 200 mg C/100 g for a period of 20 days at which time they were sacrificed. Histologic studies revealed a normal liver architecture in the germfree rats, whereas severe liver injury was noted in the ex-germfree and conventional rats. It is believed that the germfree rats lack a β -glucosidase enzyme which normally splits the glycoside into the aglycone of cycasin and its sugar component.

65-1428 EFFECT OF INGESTED CYCASIN ON RAT BLOOD PLASMA CHOLINESTERASE. (E.) Orgell, W. H. (NIH, Bethesda) and G. L. Laqueur. Fed. Proc. 23(6)(Pt. 1):1378-1380, 1964.

The feeding of cycasin (C) (75-mg/100 g of diet) to Osborne-Mendel male white rats resulted in consistently higher (56-82 μ moles/hr./ml) blood plasma cholinesterase activity levels. In a subsequent *in vitro* study, neither C nor the aqueous extract of unwashed cycad nut meal inhibited or enhanced the action of rat blood plasma cholinesterase.

65-1429 THE DISTRIBUTION OF 20-METHYLCHOLANTHRENE IN VARIOUS ORGANS AND WITHIN

THE CELL STRUCTURE DURING THE LATENT PERIOD OF DEVELOPMENT OF LEUKEMIA IN MICE. (Jap., Abstract) Moriya, J. (Dept. Intern. Med., Okayama U. Sch. Med., Japan), T. Sezaki, S. Shinagawa and S. Irima. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(2-3):254-255, 1964.

In RF mice (1-1.5 mo. old), the distribution of 20-methylcholanthrene (MC) in various organs and within the cells was measured at intervals of 2 wk. following the start of topical admin. of a 0.5% MC soln. in benzene 2x/wk. for 4 mo. At 2 wk., the levels of MC were not detectable with the fluorospectrometer (Farrand). At 4 and 6 wk. there were slight increases in the thymus and bone marrow; at 10 wk. there were marked increases in these organs while a considerable increase was seen in lymph nodes. At 12 wk. the conc. in various organs (μ /g) were: thymus, 900; bone marrow, 200; lung, 200; salivary glands, 100; lymph nodes, 75. The conc. in other organs were 10-30 μ /g. Following oral admin., the MC conc. were similar to those following topical admin. except that the high conc. in the bone marrow and thymus occurred earlier and that the conc. in the spleen was extremely high. A radioautographic study with H^3 -labeled MC revealed a distribution either throughout the entire nucleus or in only part of the nucleus of lymphoblasts or lymphocytes. No trace of H^3 -MC was detected in the cytoplasm. These findings were considered of interest due to the frequent development of myeloid and lymphatic leukemia following MC admin.

65-1430 A NEW METHOD FOR THE PREPARATION OF 4-HYDROXYAMINOQUINOLINE 1-OXIDE. (E.) Tachibana, M. (Nat. Cancer Ctr. Res. Inst., Tokyo), Y. Kawazoe, K. Aoki and W. Nakahara. G. 56(1):85-86, 1965.

65-1431 DEVELOPMENT OF CARCINOMAS IN LUPUS VULGARIS TREATED WITH VITAMIN D₂ AND ISO NICOTINIC ACID HYDRAZIDE. (Ger.) Michalowski, (Dept. Derm., Acad. Med. Lublin, Poland) and T. Kudejko. Derm. Wschr. 151(1):25-29, 1965.

Three case reports are presented.

65-1432 PATTERNS OF PROGRESSION FROM HORMONE DEPENDENCE TO AUTONOMY IN BREAST CANCER (MT). (E., Abstract) Kim, U. (Roswell Park Me. Inst., Buffalo, N. Y.). Proc. Am. Assn. Cancer Res. 6:35, 1965.

Experimental study in the rat.

65-1433 CARCINOGENICITY OF METHOXY DERIVATIVE OF AAF IN THE RAT. (E., Abstract) Gutmann, H. R. (Cancer Res. Lab., VA Hosp., Minneapolis, Minn.), H. T. Nagasawa and L. Wattenber. Proc. Am. Assn. Cancer Res. 6:25, 1965.

434 IMMUNOCHEMICAL STAINING WITH FLUORESCIN-LABELED ANTIBODIES AS AN AID IN STUDY OF SKIN CANCER FORMATION. (E.) Ruthers, C. (Dept. Biochem. Res., Roswell Park Mem. Inst., Buffalo, N. Y.) and A. Baumler. Nat. Cancer Inst. 34(2):191-200, 1965.

cluded are changes in mouse epidermis induced by methylcholanthrene and in carcinogen-induced fibrosarcoma cell carcinoma.

435 INHIBITION OF SKIN TUMORIGENESIS IN STRAIN B6A_F1/J FEMALE MICE WITH MALEIC ANHYDRIDE. (E.) Klein, M. (Dept. Anat., Tennessee Med. Units, Memphis). J. Nat. Cancer Inst. 34(2):175-183, 1965.

tumors were induced with 9,10-dimethyl-1,2-benzanthracene alone or with croton oil.

436 THE COMBINED EFFECT OF 3-METHYLCHOLANTHRENE AND N,N'-2,7-FLUORENYLENEBIS-AMIDE ON THE INDUCTION OF CANCER OF THE DULCULAR STOMACH OF THE RAT. (E.) Stewart, J. (NCI, Bethesda), K. C. Snell and H. P. ... J. Nat. Cancer Inst. 34(2):157-174, 1965.

437 EFFECTS OF FEEDING BENZO[a]PYRENE ON FERTILITY, EMBRYOS, AND YOUNG MICE. (E.) Rigdon, R. H. (Dept. Path., U. Texas Med. Sch., Galveston) and J. Neal. J. Nat. Cancer Inst. 34(2):297-305, 1965.

438 EFFECT OF CARCINOGENIC AND NONCARCINOGENIC HYDROCARBONS ON INTERFERON INDUCED VIRUS PLAQUE DEVELOPMENT. (E.) Maeyer-Guignard, J. (Dept. Virol., Rega Inst., Ghent, Belgium) and E. De Maeyer. J. Nat. Cancer Inst. 34(2):265-276, 1965.

439 DIETHYLNITROSAMINE-INDUCED HEPATIC DEGENERATION AND NEOPLASIA IN THE AQUARIUM FISH, BRACHYDANIO RERIO. (E.) Stanton, M. F. (NCI, Bethesda). J. Nat. Cancer Inst. 34(1):130, 1965.

440 PRODUCTION OF AFLATOXINS IN SUBMERGED CULTURE. (E.) Mateles, R. I. (Dept. Microbiol., Massachusetts Inst. Tech., Cambridge) and J. C. Adye. Appl. Microbiol. 13(2):208-211, 1965.

441 THE INDUCTION AND ACCELERATION OF LEUKEMIA IN NEWBORN MICE WITH 3,4-BENZ-ANTHRENE, 20-METHYLCHOLANTHRENE AND 4-NITROQUINOLINE. (Jap., Abstract) Nagamori, T. (Dept. Med., Okayama U. Sch. Med. Japan), I. Miyoshi, T. Sezaki, K. Kunisada, S. Osato and S. Osato. Nippon Ketsueki Gakkai Zasshi (Jap.) 27(2-3):255-256, 1964.

65-1442 INDUCTION OF HEPATOMAS IN MONKEYS GIVEN N-NITROSODIETHYLAMINE (DNA). (E., Abstract) O'Gara, R. W. (NCI, Bethesda) and M. G. Kelly. Proc. Am. Assn. Cancer Res. 6:50, 1965.

65-1443 REVERSIBLE UPTAKE OF 3,4-BENZPYRENE BY ISOLATED CELLS. (E., Abstract) Niskanen, E. E. (Child. Cancer. Res. Found., Boston, Mass.). Proc. Am. Assn. Cancer Res. 6:49, 1965.

65-1444 AUTOCHTHONOUS TUMOR METASTASIS IN MICE. (E., Abstract) Poel, W. E. (Grad. Sch. Public Health, U. Pittsburgh, Pa.). Proc. Am. Assn. Cancer Res. 6:51, 1965.

65-1445 TUMORIGENIC ACTIVITY OF HYDROGENATED DERIVATIVES OF DIBENZ[a,h]ANTHRACENE. (E.) Lijinsky, W. (Dept. Oncol., Inst. Med. Res., Chicago Sch. Med., Ill.), R. Garcia, B. Terracini and U. Saffiotti. J. Nat. Cancer Inst. 34(1):1-6, 1965.

65-1446 SKIN TUMORIGENESIS BY DIBENZ[a,h]ANTHRACENE MODIFIED BY ITS HYDROGENATED DERIVATIVES. (E.) Lijinsky, W. (Dept. Oncol., Inst. Med. Res., Chicago Sch. Med., Ill.), F. Cefis, H. Garcia and U. Saffiotti. J. Nat. Cancer Inst. 34(1):7-12, 1965.

65-1447 BODY SIZE AND LUNG-TUMOR SUSCEPTIBILITY IN OUTBRED MICE. (E.) Bloom, J. L. (Inst. Anim. Genet., U. Edinburgh, Scotland). J. Nat. Cancer Inst. 33(4):599-606, 1964.

65-1448 A GENE WITH MAJOR EFFECT ON SUSCEPTIBILITY TO INDUCED LUNG TUMORS IN MICE. (E.) Bloom, J. L. (Inst. Anim. Genet., U. Edinburgh, Scotland) and D. S. Falconer. J. Nat. Cancer Inst. 33(4):607-618, 1964.

65-1449 AUTORADIOGRAPHIC LOCALIZATION OF TISSUE-BOUND TRITIATED 7,12-DIMETHYLBENZ[a]ANTHRACENE IN MOUSE SKIN 24 AND 48 HOURS AFTER SINGLE APPLICATION. (E.) Nakai, T. (Dept. Oncol., Inst. Med. Res., Chicago Sch. Med., Ill.) and P. Shubik. J. Nat. Cancer Inst. 33(5):887-891, 1964.

65-1450 EFFECTS OF POLYCYCLIC HYDROCARBONS ON MAMMARY HOMOGRAFT SURVIVAL AND TUMORIGENESIS IN RATS. (E.) Dao, T. L. (Roswell Park Mem. Inst., Buffalo, N. Y.), Y. Tanaka and D. Gawlak. J. Nat. Cancer Inst. 33(6):963-970, 1964.

20-Methylcholanthrene and 9,10-dimethyl-1,2-benzanthracene were employed.

65-1451 CARCINOGENIC DOSE-RESPONSE CURVE TO ORAL DIETHYLSTILBESTROL. (E.) Gass, G. H. (Dept. Physiol., Southern Illinois U., Carbondale), D. Coats and N. Graham. J. Nat. Cancer Inst. 33(6):971-977, 1964.

Intake C3H male and female mice and castrate strain A male mice were employed.

65-1452 INDUCTION OF MALIGNANT TUMORS IN THE RABBIT BY ORAL ADMINISTRATION OF DIETHYL-NITROSAMINE. (E.) Rapp, H. J. (NCI, Bethesda), J. H. Carleton, C. Crisler, and E. M. Nadel. J. Nat. Cancer Inst. 34(4):453-458, 1965.

65-1453 METHYLATION OF LIVER AND KIDNEY RIBONUCLEIC ACIDS IN NEWBORN RATS TREATED WITH H³-DIMETHYLNITROSAMINE. (E.) Lee, K. Y. (Dept. Oncol., Chicago Sch. Med., Ill.) and K. Spencer. J. Nat. Cancer Inst. 33(6):957-961, 1964.

65-1454 CHROMOSOME PATTERNS IN MOUSE LUNG TUMORS. (E.) Dipaolo, J. A. (NCI, Bethesda). J. Nat. Cancer Inst. 34(3):337-343, 1965.

65-1455 KINETICS OF CHANGES, IN THYMUS AND OTHER LYMPHOPOIETIC ORGANS OF ADULT MICE, INDUCED BY SINGLE DOSES OF URETHAN. (E.) Fiore-Donati, L. (Inst. Pathol. Anat., U. Bari, Italy) and A. M. Kaye. J. Nat. Cancer Inst. 33(6):907-920, 1964.

65-1456 CANCER INDUCTION BY POLYURETHAN AND POLYSILICONE PLASTICS. (E.) Hueper, W. C. (NCI, Bethesda). J. Nat. Cancer Inst. 33(6):1005-1027, 1964.

65-1457 OBSERVATIONS ON THE METABOLISM OF N-2-FLUORENYLACETAMIDE IN DOGS AND RATS. (E.) Dyer, H. M. (NCI, Bethesda), B. E. Sherwin and H. P. Morris. J. Nat. Cancer Inst. 34(3):363-370, 1965.

65-1458 TUMORIGENIC NUCLEIC ACID EXTRACTS FROM TISSUES OF A TRANSPLANTABLE CARCINOMA, Vx7. (E.) Ito, Y. (Dept. Hyg., Nara Gakugei U., Japan) and C. A. Evans. J. Nat. Cancer Inst. 34(3):431-437, 1965.

65-1459 CARCINOGENIC ACTIVITY OF CIGARETTE SMOKE CONDENSATE. III. BIOLOGICAL ACTIVITY OF REFINED TAR FROM SEVERAL TYPES OF CIGARETTES. (E.) Bock, F. G. (Roswell Park Mem. Inst., Buffalo, N. Y.), G. E. Moore and P. C. Clark. J. Nat. Cancer Inst. 34(4):481-493, 1965.

Assays were performed on the skin of female ICR/H Swiss mice.

65-1460 TISSUE CHANGES IN MICE WITH PERSISTENT VAGINAL CORNIFICATION INDUCED BY EARLY POST-NATAL TREATMENT WITH ESTROGEN. (E.) Takasugi, N. (Dept. Zool., U. California, Berkeley) and H. A. Bern. J. Nat. Cancer Inst. 33(5):855-865, 1965.

65-1461 HIGH YIELDS OF LEUKEMIAS IN RAT FOLLOWING MULTIPLE INJECTIONS OF 7,12-DIMETHYLBENZ(a)ANTHRACENE. (E., Abstract) Fukunishi, R. (Ben May Lab. Cancer Res., U. Chicago, Ill.), E. Ford and C. Huggins. Proc. Am. Assn. Cancer Res. 6:21, 1965.

65-1462 METABOLISM OF AFLATOXIN B₁ IN THE RAT. (E., Abstract) Falk, H. L. (NCI, Bethesda), S. J. Thompson and P. Kotin. Proc. Am. Assn. Cancer Res. 6:18, 1965.

65-1463 THE RESPONSE OF MONKEYS TO FLUORENYL-ACETAMIDES. (E., Abstract) Dyer, H. (NCI, Bethesda), M. G. Kelly and R. O'Gara. Proc. Am. Assn. Cancer Res. 6:16, 1965.

65-1464 TRANSPLANTABLE MELANOTIC TUMORS INDUCED IN AxC RATS BY A SINGLE FEEDING OF DMBA. (E., Abstract) Iglesias, R. (Inst. Exp. Med., Nat. Inst. Health, Santiago, Chile) and S. Salin. Proc. Am. Assn. Cancer Res. 6:32, 1965.

65-1465 FURTHER STUDIES OF LEYDIG CELL TUMORIGENESIS IN MICE. (E., Abstract) Husar, R. A. (Am. Med. Ctr., Denver, Colo.). Proc. Am. Assn. Cancer Res. 6:31, 1965.

65-1466 STUDIES IN AIR POLLUTION CARCINOGENESIS. (E., Abstract) Hoffmann, D. (Sloan-Kettering Inst., New York, N. Y.) and E. L. Wynder. Proc. Am. Assn. Cancer Res. 6:29, 1965.

65-1467 TUMORS IN RAT AFTER INJECTION OF HEPATOMA AND PRENEOPLASTIC NUCLEIC ACIDS. (E., Abstract) Cantarow, A. (Jefferson Coll. Med., Philadelphia, Pa.), T. L. Williams and J. W. Goddard. Proc. Am. Assn. Cancer Res. 6:10, 1965.

65-1468 EVIDENCE FOR BINDING OF β -PROPIOLACTONE TO MOUSE SKIN DNA *IN VIVO* AND ITS CORRELATION WITH TUMOR-INITIATING ACTIVITY. (E., Abstract) Colburn, N. H. (McArdle Lab., U. Wisconsin, Madison) and R. K. Boutwell. Proc. Am. Assn. Cancer Res. 6:11, 1965.

- 469 ANTIGENIC DIVERSION IN CANCER. (E., Abstract) Day, E. D. (Duke U. Ctr., Durham, N. C.). Proc. Am. Assn. Cancer Res. 6:13, 1965.
y was made in rat hepatomas induced by N-2-
- 470 DIFFERENTIAL CYTOTOXICITY IN TISSUE CULTURE OF CARCINOGENIC HYDROCARBONS SOLVED IN DIMETHYL SULFOXIDE. (E., Abstract) ond, L. (Wistar Inst., Philadelphia, Pa.) H. Koprowski. Proc. Am. Assn. Cancer Res., 1965.
- 471 HISTOLOGIC ALTERATIONS IN RNA OF PARENCHYMAL CELLS DURING HEPATIC CARCINOSIS. (E., Abstract) Dunn, W. L. (Cancer Ctr., U. British Columbia, Vancouver, da). Proc. Am. Assn. Cancer Res. 6:16, 1965.
inogen employed was ethionine.
- 472 CYTOTOXIC EFFECTS OF THE MYCOTOXINS OF PENICILLUM ISLANDICUM SOPP, LUTEOSKYRIN CHLORINE-CONTAINING PEPTIDE ON CHANG'S LIVER S AND HELA CELLS. (E.) Umeda, M. (Dept. ., U. Tokyo Sch. Med., Japan). Acta Path. 14(3):373-394, 1964.
- 473 9-THIENYLANTHRACENES. (E.) Vingiello, F. A. (Dept. Chem., Virginia Polytechnic ., Blacksburg, Va.), S.-G. Quo, P. Polss and enson. J. Med. Chem. 7(6):832-833, 1964.
e compounds were prepared to make new poly- ic aromatic compounds available for carcino- city testing.
- 474 7- AND 12-(o-HALOPHENYL)BENZ[a]ANTHRA- CENES. (E.) Vingiello, F. A. (Dept. ., Virginia Polytechnic Inst., Blacksburg, , L. Ojakaar and R. Kelsey. J. Med. Chem. :144, 1965.
e compounds were prepared as part of a pro- n to make substituted benzantracenes available antitumor screening.
- 65-1475 COMPARATIVE HORMONAL RESPONSES IN VITRO OF MOUSE MAMMARY GLANDS FROM AGENT- CARRYING AND AGENT-FREE STRAINS. FORMATION OF HYPERPLASTIC NODULES. (E.) Lasfargues, E. Y. (Dept. Microbiol., Columbia U., New York, N. Y.) and M. R. Murray. Acta Un. Int. Cancr. 20(6-7): 1458-1462, 1964.
- 65-1476 CARCINOMA OF URINARY BLADDER AND SMOKING. (Heb.) Harefauh 68(4):135-136, 1965.
- 65-1477 HORMONE-DEPENDENT CANCERS. (Heb.) Harefuah 68(4):134-135, 1965.
- 65-1478 CARCINOGENIC ACTIVITY OF N-ISOPROPYL- α -(2-METHYLHYDRAZINO)-p-TOLUAMIDE-HCL (MIH, RO 4-6467, NSC 77213). (E., Abstract) Kelly, M. G. (NCI, Bethesda) and R. W. O'Gara. Proc. Am. Assn. Cancer Res. 6:34, 1965.
- 65-1479 INHIBITION BY 7:12-DIMETHYL-1:2-BENZ- ANTHRACENE (DMBA) OF THE ACTION OF CHORIONIC GONADOTROPHIN (CG) ON THE MOUSE OVARY. (E., Abstract) Jull, J. W. (Cancer Res. Ctr., U. British Columbia, Vancouver, Canada). Proc. Am. Assn. Cancer Res. 6:34, 1965.
- 65-1480 SPECIFIC AND NON-SPECIFIC DEFENSE MECHA- NISMS AGAINST TUMORS. (Hun.) Benkő, S. (Clin. Intern. Med., Med. U. Szeged, Hungary). Magy. Onkol. 8(4):200-204, 1965.
- 65-1481 D-GALACTOSE AND L-SORBOSE INHIBITION IN TUMOROUS TISSUE GROWTH INDUCED WITH (2,4-DICHLOROPHENOXY)ACETIC ACID. (Hun.) Faludi, B. and E. Parádi. Biol. Kozlemen. 12(1): 25-32, 1964.
- 65-1482 AMOUNTS OF SMOKE CONDENSATE IN RELATION TO RATE OF SMOKING AND BUTT LENGTH OF KING-SIZE CIGARETTES, WITH OR WITHOUT FILTERS. (Dan.) Lam, J. (Inst. Chem., Arhus U., Denmark). Ugeskr. Laeg. 127(11):380-383, 1965.
- 65-1483 MEDICAL RECOMMENDATIONS CONCERNING AIR QUALITY. (Sw.) Friberg, L. and R. Rylander. Nord. Hyg. T. 46(1):1-32, 1965.

See also abstract nos.: 1311, 1313, 1315, 1321, 1323, 1324, 1326, 1328, 1329, 1333, 1338, 1343, 1344, 1363, 1373, 1517, 1521, 1557, 1673, 1678

VIRAL CARCINOGENESIS

- 65-1484 OCCURRENCE OF TUMOURS IN MICE AFTER INOCULATION OF ROUS SARCOMA AND ANTIGENIC CHANGES IN THESE TUMOURS. (E.) Kolkovský, P. (Inst. Exp. Biol., Czech. Acad. Sci., Prague) and J. Bubeník. Folia Biol. (Praha) 10(2):81-89, 1964.

Tumor incidence in newborn A strain mice after s.c. inoc. of 0.1 ml of a homogenate of either Schmidt-Ruppin (SR) strain or Prague (P) strain of Rous sarcoma virus was as follows: 64/70 (91.5%) and 38/44 (86.3%), resp., at 14 days; 43/65 (61.5%) and 24/42 (54.5%), resp., at 21 days; 37/60 (52.8%) and 21/42 (47.7%), resp., at 28 days; 36/55 (51.4%) and 12/38 (27.3%), resp., at 48 days; 18/55 (25.7%) and 4/38 (9.9%), resp., at 60 days. Tumors induced by P regressed more rapidly and in a higher percentage than those induced by SR; successful passages were maintained for SR-induced tumors but not for P-induced tumors. The induction of a new tumor antigen was demonstrated by isoimmunity methods for SR-induced tumors, RVA2 and RVA5 in C57BL mice and RVA4 in C3H mice. A certain degree of antigenic overlapping was present. Back-transfers to chicks by means of intact cells showed that the virus was present in all 3 tumors at least in the form of provirus.

- 65-1485 THE MORPHOLOGY AND TRANSPLANTABILITY OF MOUSE EMBRYO CELLS TRANSFORMED IN VITRO BY POLYOMA VIRUS. (E.) Weisberg, R. A. (Dept. Biol., California Inst. Tech., Pasadena). Virology 23(4):553-564, 1964.

In studies designed to elucidate the polyoma virus (Py)-induced transformation process and its relationship to in vivo carcinogenesis, various properties of Py-infected mouse embryo cultures were occasionally found to occur rapidly in uninfected control cultures also. These included the acquisition of the ability to form "thick", multilayered cell sheets and to form tumors upon implantation. Upon testing for the Py-specific antigen, however, it was found that the Py-infected ones possessed it while the uninfected lines did not. This shows that the cellular changes induced by Py infection would not have occurred spontaneously. Tumor-producing Py-infected cultures differed from non-tumor-producing cultures in several characteristics, particularly in the formation of cells which could form dense, heaped-up colonies in vitro. (See also CRA 1(12):#2147 and #2148, 1964.)

- 65-1486 A CONTRIBUTION TO THE QUESTION OF THE ANTIGENICITY OF SPONTANEOUS LYMPHOID AKR LEUKAEMIA. (E.) Bubeník, J. (Inst. Exp. Biol., Czech. Acad. Sci., Prague), B. Adamcová and P. Koldovský. Folia Biol. (Praha) 10(4):293-300, 1964.

None of the methods of preimmunization employed (preimmunization with irradiated tissue, increasing subthreshold doses of living cells, cells lysed by distilled water and cells killed with alcohol or formaldehyde) were capable of inducing even partial resistance to AKR leukemia in syngeneic AKR male mice. Immunization of C57BL/6 and DBA 1 mice against this leukemia was successful; the antisera obtained after absorption with normal AKR tissue did not damage normal lymphoid cells of AKR strain, but caused prolonged survival of AKR leukemic mice after passive transfer in vivo and displayed CPE on AKR leukemic cells in vitro. A discussion (20 references) of the significance and various interpretations of the results is included.

- 65-1487 THE ANTIGENIC DISTRIBUTION OF LEUKEMIA VIRUS IN MICE WITH THE USE OF FLUORESCENCE ANTIBODY METHOD. WHERE IS THE PARASITIC LEUKEMIA VIRUS IN THE CELL? (Jap.) Ichikawa, Y. (Virus Res. Inst., Kyoto U. Sch. Med., Japan). Nippon Rinsho (J. Jap. Clin. Med.) 21(16):1229-1242, 1963.

A study is presented of antigen distribution of SC-1 transplantable mouse lymphatic leukemia (originally induced by a cell-free filtrate of spontaneous myeloid leukemia) after establishment in in vitro cultures. Electro microscopy revealed that virus particles were released from the surface of the cell during proliferation. Use of the fluorescent antibody technique, the distribution of 2 antigens was studied: Antigen I, obtained from the culture fluid; Antigen II, obtained from the homogenate of SC-1 cells. With the use of Antigen I, fluorescence was observed only on the cell surface and this fluorescence increased during cell division. With use of Antigen II diffuse fluorescence was seen within the cytoplasm and was more pronounced during the interphase.

- 65-1488 RELATION OF VIRUSES TO CANCER. (Russian.) Koprowski, H. (Wistar Inst., Philadelphia, Pa.). Vop. Virus. 9(5):543-549, 1964.

A discussion is presented of chromosomal changes following a viral infection, isolation of an infectious virus in the process of transformation (SV40, polyoma virus), presence of antigens, DNA and RNA-containing viruses and leukemia viruses. Two hypotheses on viral carcinogenesis are given. 1. Predetermination, i.e., under the action of various physical, chemical and infectious agents some of the normal cells are predetermined to become transformed into cancer cells; 2. Cell transformation could be affected by various influences which may accompany infection of tissues by oncogenic agents. So, tumor virus could act as a mutant of the normal cell genotype. Also

used is one scheme for the formation of the and cellular components during the infection of the cell by RNA- and RNA-containing viruses, and another for the intracellular reproduction of Rous sarcoma virus.

1489 THE PURIFICATION OF SIMIAN VIRUS 40. (E.) Black, P. H. (NIH, Bethesda), Crawford and L. V. Crawford. *Virology* 26:381-387, 1964.

Procedure for the purification (centrifugation and centrifugation in a density gradient) of SV40 to human papilloma virus was presented in detail. The ratio of the densities of SV40 to human papilloma virus was 1.26. "Full" and "empty" virus particles had densities of 1.32 and 1.29 g/ml, resp. Sedimentation coefficient of the "full" particles was $S_{20,w} = 240$. The particle:infectivity ratio of the purified SV40 ranged between 100 and 200 "full" particles per PFU.

1490 SOURCE OF GENETIC INFORMATION FOR SV40 TUMOR CF ANTIGENS. (E.) Sabin, A. B. (U. Cincinnati Coll. Med., Ohio) and M. A. Koch. *Proc. Nat. Acad. Sci. USA* 52(5):1138, 1964.

Infection *Ceropithecus* monkey sera, which contained neutralizing and complement-fixing anti-SV40 virus antibodies, showed no reaction with SV40 tumor CF antigens. No reaction was noted between the sera of tumor-bearing hamsters containing specific CF antibodies for SV40 tumor antigens and SV40 virus infected cell cultures containing only virus antigen (lacking virus neutralizing antibodies). Only after SV40 infection of normal BS-C-1 cells and during max. viral synthesis, CF antigens were produced which could not be demonstrated in the virus particles, but which were discernible from the specific CF antigens found in continuously transplanted SV40 tumors. After completion of the SV40 CPE (96 hr.), the "virus-like" infected normal cell antigens (INCA) disappeared, and the CF antigens of the virus particles attained their max. conc. The CF antigens could be sedimented with the virus particles and were relatively stable at 56°C, whereas the INCA and tumor antigens were destroyed at 56°C. Because the CF antigens in the sera of tumor-bearing hamsters could be completely removed by absorption with virus INCA, it was concluded that the genetic information for the synthesis of the tumor CF antigens is derived from provirus or from some incomplete form of the SV40 virus genome which is continuously transmitted in the tumor cells. See also CRA 1(2):#261; *ibid.*, (7):#1333, and *ibid.*, (11):#1951, 1964.

65-1491 SPECIFIC COMPLEMENT-FIXING TUMOR ANTIGENS IN HUMAN CELLS MORPHOLOGICALLY TRANSFORMED BY SV40 VIRUS. (E.) Sabin, A. B. (U. Cincinnati Coll. Med., Ohio), H. M. Shein, M. A. Koch and J. F. Enders. *Proc. Nat. Acad. Sci. USA* 52(6):1316-1318, 1964.

The specificity of SV40 tumor complement-fixing (CF) antigens in human embryonic kidney cells and hamster kidney cells that were morphologically transformed by SV40 virus *in vitro*, was demonstrated: the CF antigens reacted with anti-SV40 tumor hamster serum but not with antipolyoma tumor hamster serum. The comparative conc. of tumor CF antigens was studied, and at least one component was about the same in the transformed human cells as in hamster tumor cells when tested with hamster serum; however, in the presence of a 5% suspension of the corresponding tumor cells, the titer of CF antibody was only 1:32 with the human cells whereas it was 1:128 with the hamster cells, indicating an insufficient conc., or a lack of, another component of the CF antigens in the 5% suspension of the human transformed cells.

65-1492 INHIBITORS OF POLYOMA VIRUS HEMAGGLUTINATION IN ANIMALS OF DIFFERENT SPECIES AND IN CELL CULTURES. (It.) Salmon, S. (Inst. Microbiol., U. Florence, Italy) and I. Berdondini. *Sperimentale* 114(1):56-65, 1964.

Inhibitors of polyoma virus (PV) hemagglutination (PVH) were found in the blood serum and organ extracts of newborn and adult mouse, hamster, rabbit, guinea pig, chicken and frog. Occurrence of the inhibitors bore no relation to age or to species or organ sensitivity to the PV carcinogenic activity. Inhibitors of PVH were also demonstrated in extracts of cell cultures sensitive (mouse embryo) as well as resistant (HeLa) to PV infection. Inhibition titers were higher at 4°C than at 37°C, indicating that the inhibitory action was due to the presence of inhibitors and not to antibodies. However, rabbit and hamster sera presented similar inhibition titers at both temperatures; this would suggest the presence of antibodies or of inhibitors of different kinds. (See also CRA 1(4):#705, 1963.)

65-1493 THE PAPILLOMA OF RABBITS INDUCED BY THE VIRUS OF SHOPE: HISTOLOGIC FEATURES RELATED TO AMOUNT OF VIRUS IN THE TUMOR. (E.) Evans, C. A. (Dept. Microbiol., U. Washington Sch. Med., Seattle), A. L. Rashad and N. K. Mottet. Pp. 587-600 in *The Epidermis*. Montagna, W. and W. C. Lobitz, Jr. (Eds.). Academic Press, New York, 1964, 649 pp.

A more detailed account of the paper abstracted as CRA 1(4):#717, 1963.

- 65-1494 AN UNIDENTIFIED VIRUS WHICH CAUSES THE RAPID PRODUCTION OF TUMOURS IN MICE. (E.) Harvey, J. J. (Dept. Cancer Res., London Hosp. Res. Lab.). *Nature (London)* 204:1104-1105, 1964.

Plasma from a leukemic albino rat (which was inoc. when newborn with Maloney leukemogenic virus, MLV) was stored at -70°C for 3 mo., diluted and then filtered and inj. into 15 newborn BALB/c mice. Only 6/15 survived the weaning, and 5/6 developed splenomegaly and tumors at or near the inj. site by day 32. Further inj. of this plasma filtrate into newborn BALB/c mice and Chester Beatty albino (outbred) and hooded (inbred) rats produced tumors in 28/35 mice and 1/13 rats, and splenomegaly in all animals. The tumors were anaplastic sarcomas or angiomatous tumors. CB hooded rats were inj. with the sarcoma virus (SV), and 30/46 developed gross splenomegaly and 16 had sarcomas of the diaphragm or of other sites; 4/9 cream and 5/19 golden hamsters also developed sarcomas which were mainly situated on or near the diaphragm. When plasma of inoc. rats and tissues of tumor-bearing mice were inj. into BALB/c mice tumors developed, the incidence of which declined with increasing age of the test mice; however, incidence of splenomegaly remained high. When the original plasma filtrate was inj. into newborn Chester Beatty albino rats and their plasma collected at 8, 30, and 54 days and tested in 1-3-day-old BALB/c mice, tumors and splenomegaly developed after 12 days with the 30-day and 54-day samples. Mice receiving the 8-day sample had no symptoms for 70 days, then developed typical signs of MLV-induced leukemia. Tests indicate that it is unlikely that the tumors produced are due to polyoma or any closely related viruses.

- 65-1495 DISCOVERY OF A SPECIFIC ANTIGEN IN THE TISSUES OF MICE WITH LEUKEMIA INDUCED BY MAZURENKO VIRUS BY MEANS OF A CYTOTOXIC REACTION IN VITRO. (Rus.) Zueva, Iu. N. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). *Vestn. Akad. Med. Nauk SSSR* 19(11):51-54, 1964.

A specific antigen was found in the tissue of C57Br mice bearing leukemia induced by the Mazurenko virus and determined by use of a heterologous sera (from rabbits immunized by leukemic mouse tissue extracts) in a cytotoxic test, in vitro. The specific antigen was also demonstrated in an isologous system (i.e., using mouse sera for the cytotoxic reaction), as described below. Two mo. after the repeated immunization of C57Br mice with isologous leukemic tissue extracts the mice were inj. s.c. with a suspension of living leukemic cells. Control (not immunized) mice died within 2 wk., while treated mice survived and were inoc. two more times with the leukemic cell suspension. Sera of 7/11 mice showed a positive cytotoxic index when tested with leukemic

suspension but had no effect on the normal cell suspension. Complement fixation reaction failed to detect this antigen.

- 65-1496 STUDY OF SPECIFIC ANTIGENS IN THE ORGANS OF MICE AND RATS, WITH MAZURENKO VIRUS-INDUCED LEUKEMIA, BY MEANS OF THE GEL PRECIPITATION METHOD. (Rus.) Shershul'skii, L. V. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow) and E. S. Ievleva. *Vestn. Akad. Med. Nauk SSSR* 19(11):46-50, 1964.

A specific antigen (SA) was found in the tissue of mice (C57Br) and rats (mixed breed) with Mazurenko virus-induced leukemia. This antigen was absent in the tissue of normal animals. SA was usually found in the lymph nodes and thymus, less was found in the spleen, and it was absent in the liver of leukemic mice. Its conc., in the same organs of different animals, fluctuated significantly. The tissue of leukemic mice showed loss of normal tissue components.

- 65-1497 THE VIRAL ETIOLOGY OF HUMAN LEUKEMIA. (It.) Schwartz, S. O. (Northwestern Univ. Sch. Med., Chicago, Ill.). *Gazz. Sanit.* 35(9):403-406, 1964.

Essentially similar to CRA 1(9-10):#1781, 1964.

- 65-1498 PARALYSES INDICATIVE OF GROSS LEUKEMIA IN THE RAT. (Fr.) Levy, J. P. (Inst. Leukemia Res., Saint-Louis Hosp., Paris), J. Lasneret, J. Peries and M. Boiron. *Experientia* 20(11):627-628, 1964.

The i.p. inoc. of newborn Wistar CF rats with acellular extracts of Gross virus produced leukemia in 86% (104/120). A paralysis of the hind legs was seen in 45% of the leukemic rats which was due to compression of the spinal cord by leukemic cells infiltrating the lumbar area. Attempts to demonstrate the presence of a neurotropic virus failed.

- 65-1499 INDUCTION BY ADENOVIRUS TYPE 7 OF TUMORS IN HAMSTERS HAVING THE ANTIGENIC CHARACTERISTICS OF SV40 VIRUS. (E.) Huebner, R. J. (NIH, Bethesda), R. M. Chanock, B. A. Ruff and M. J. Casey. *Proc. Nat. Acad. Sci. USA* 52(6):1333-1340, 1964.

Human adenovirus (AD) type 7 (AD-7) strain L.L. found to be negative for SV40 virus in green monkey kidney (GMK) cultures, was inoc. into newborn hamsters after hamsters after passage 28 or 29. Tumors first appeared 69-71 days after inoc., and 27/36 hamsters inj. with passage 28 virus had developed s.c. tumors by day 131. Virus transplanted i.p. or s.c. into other newborn hamsters, explants of the tumors grew rapidly. Grossly and microscopically many of the primary

s (and most of the explanted tumors) resembled SV40 tumors; however, some had islands of cells similar to those seen in AD-12 tumors. Complement-fixing antibodies to SV40 tumor antigens, to homologous (L.L.) antigens and to SV40 nonviral cell-associated "T" antigens were found to develop in sera bearing primary or first through third transplants of the L.L. tumors for 6 or more months. None of the sera obtained from the tumor-bearing animals reacted with conventional SV40 antigen, AD-12 or polyoma hamster tumor antigens, nor did any sera possessing SV40 antibodies react with AD-7 viral antigen. Hamsters failed to develop tumors did not develop antibodies to tumor or "T" antigens. Sera obtained from animals bearing tumors gave negative results when tested for neutralizing antibody to adenovirus type 7. When tested with SV40 tumor serum, L.L. tumor cells showed intranuclear fluorescence similar to that seen in SV40 tumors. Development of L.L. tumors in hamsters could be prevented by specific anti-adenovirus type 7 antiserum, but not by SV40 antiserum. It was concluded that the L.L. tumors, the antigens found in the tumor and also the infected tissue cultures containing SV40 virus-specific antigens were completely dependent upon the adenovirus type 7 virus. The neoplastic effects produced by the strain might possibly have been produced by recombination derived from a certain linkage of the adenovirus and the SV40 virus genomes.

65-1501 EVIDENCE FOR A POSSIBLE GENETIC HYBRID BETWEEN ADENOVIRUS TYPE 7 AND SV40
S. (E.) Rowe, W. P. (NIH, Bethesda, Md.)
G. Baum. Proc. Nat. Acad. Sci. USA 51:1340-1347, 1964.

65-1502 preparation of the L.L. strain of adenovirus (AD) 7 (L.L.-E46) which had been freed of SV40 virus contamination was found to induce an antiserum reactive with SV40 hamster tumor sera in complement-fixation (CF) and complement-fixation (FA) and complement-fixation tests. Immunofluorescent staining of tissue sections of African green monkey kidney cells, KB cells, and human embryo kidney cells which had been infected with SV40 or adenovirus 7 showed that SV40 induced stainable SV40 (T) and viral (V) antigens, while L.L.-E46 induced SV40T antigens but no SV40V antigens. Sera from hamsters carrying SV40 or L.L.-E46-induced tumors showed comparable CF and FA antibody reactivity to both SV40 and L.L.-E46 tumor cells and L.L.-E46-infected HEK cells; in general, the degree of reactivity in the FA test correlated with the CF antibody titer. The data indicate that SV40T antigen is a specific response to SV40 virus. The antigen also appeared in SV40-infected L.L.-E46-infected chick embryo fibroblasts, giving further support to the view that it is derived from information in the viral genome rather than in the host-genetic apparatus. Evidence that the E46 virus pool is not a simple

mixture of AD-7 and SV40 viruses was indicated by failure to recover infectious SV40 virus from the E46 pool and from hamster tumors induced by E46, and also by the failure of the various L.L.-E46 preparations to induce SV40V antigen. Neutralization tests showed that the integrity of the AD-7 infectious particle was essential for SV40 antigen induction by L.L.-E46, and that the SV40 genetic material is not contained within the SV40 capsid protein. When the E46 virus was heated at 56°C/10 min., its adenovirus infectivity and ability to induce SV40T antigen was inactivated; such treatment does not significantly affect the infectivity of intact SV40 virus. Further experimentation gave support to evidence that a proportion of the L.L.-E46 virus population involves a genetic hybrid consisting of AD-7 capsids containing both AD-7 and SV40 genetic material. (See also CRA 1(12):#2157; *ibid.*, 2(5):#932, 1964 and the preceding abstract.)

65-1501 MEETING OF THE DUTCH PATHOLOGICAL-ANATOMICAL SOCIETY. 78TH MEETING, HELD ON FEBRUARY 29, 1964, AT THE PATHOLOGICAL-ANATOMICAL LABORATORY OF THE NATIONAL UNIVERSITY AT LEIDEN. (Dut.) Swaen, G. J. V. Nederl. T. Geneesk. 108(46):2232-2233, 1964.

Swaen reported that inj. of Rauscher virus (host not stated) was followed by increased splenic erythropoiesis and thymic atrophy, and that neoplastic sequelae consisted chiefly of various forms of lymphadenopathy with considerable variations in cell growth, anaplasia and tendency to develop leukemia. Tumors of the reticulo-epithelial component of the thymus were also observed; some, but not all of these contained many giant cells with PAS-positive protoplasm. Combinations of lymphatic and reticulo-epithelial tumors were not unusual. Chloroleukemia also occurred occasionally. In response to a question he stated that lymphatic thymoma has been reported as developing after inj. of leukemogenic viruses but that reticulo-epithelial tumors had not been observed previously. In response to another question he agreed that the chloroleukemias seen might have developed spontaneously; he added that a viral etiology has now been established for many of the so-called "spontaneous" leukemias. Other workers stated that hypophysectomy exerted a significant effect on the β -glucuronidase activity of the rat adrenal.

65-1502 INTERACTION OF ROUS VIRUS WITH MOUSE CELLS IN VITRO. (Rus.) Obukh, I. B. (N. F. Gamaley Inst. Epidemiol. Microbiol., Moscow) and I. N. Kriukova. Vop. Virus 9(5):538-543, 1964.

After infection of embryonic mouse cells with Rous virus (RV; strain Carr (C), Englebrecht-Holm (EH) and Diad'kova (D); titer $1:10^4$) two types of relationships were found between virus and cell: latent infection and tumor-like cell transformation.

Viral antigen was preserved within the cell cytoplasm for up to 2 days. In the nucleoli of cells in culture infected with Strain C or D, viral antigen was preserved for 100 and 20 days, resp. The infectious form of virus was retained in cultures for 1 day. Neither the infected nor the control cultures showed any virus-blocking properties. Cell sensitivity toward virus was not increased by irradiation or by storage of cultures at room temperature. Cultured cells grew more rapidly after virus infection. Normal mouse fibroblasts, when grown together with sarcoma cells of the C and EH strains, underwent transformation. However, when inoc. into isologous animals, these cells did not produce tumors. Mouse fibroblasts were not transformed by D strain #5.

- 65-1503 REDUCTION OF THE PLASMA CONCENTRATION OF CHARLOTTE FRIEND LEUKEMIA VIRUS BY ADOPTIVE IMMUNOTHERAPY (GRAFT OF ALLOGENIC BONE MARROW). (Fr.) Mathé, G. (Cancer Inst., Claude Bernard Assn., Villejuif, Seine, France) and J. L. Amiel. *C. R. Acad. Sci. (Paris)* 259(3) (Group. 13):4408-4410, 1964.

In two experiments involving 336 animals, DBA/2xCBA mice, 3 mo. old, were inoc. i.p. with 0.2 ml of blood or serum from isologous donors which had been infected 4 days previously with Friend leukemia virus (FLV) followed by: (1) total body irradiation (TBI; 950 r); (2) TBI + i.v. inj. of isogenic bone marrow (BM; 10^7 cells); (3) TBI + i.v. inj. of allogenic BM (10^7 cells) from adult C57Bl/6 mice; or (4) TBI + i.v. inj. of allogenic BM (10^7 cells) from C57Bl/6 mice previously vaccinated with FLV (25% spleen suspension; 0.2 ml every 4 days x 4), the last dose was admin. 1 mo. prior to the withdrawal of BM. Criterion for the decrease of FLV conc. in the donor blood was taken to be the length of survival of the recipient. All controls as well as all mice inoc. with blood from Groups 1 and 2 died of leukemia within 100 days, indicating that TBI either alone or followed by inj. of isogenic BM had no effect on the FLV plasma conc. Mice surviving without leukemia beyond day 100 were seen only in recipients of blood from Groups 3 and 4, indicating that the immune reaction caused by the graft of allogenic BM had reduced the FLV plasma conc. Vaccination of C57Bl/6 BM donors appeared to have a supplementary effect: 7/31 mice inoc. with sera from Group 4 survived without leukemia as compared with 1/31 receiving sera from donors treated with allogenic BM from nonvaccinated mice. The difference was considered statistically significant.

- 65-1504 VIRUS DEFECTIVENESS AND CELL TRANSFORMATION IN THE ROUS SARCOMA. (E.) Rubin, H. (Virus Lab., U. California, Berkeley). *J. Cell. Comp. Physiol.* 64(2) (Pt. 2):173-179, 1964.

An analysis of the helper virus (HV)-dependent and HV-independent functions of Rous sarcoma virus

(RSV) is presented. RSV is capable of entering a cell and causing its malignant transformation without the aid of HV. RSV controls the morphology of malignant transformation and replicates its own genome (in solitary infections), as evidenced in RSV-nonproducing (NP) cells which retain the potentiality to produce RSV upon addition of HV. RSV is completely dependent on HV for synthesis of its protein coat. Therefore, RSV bears the antigenic identity of its HV. For example, the Bryan (B) stock of high-titer strain of RSV contains a predominant type of HV, called RAV 1 and a less dominant type, RAV 2, each with characteristic host responses; similar host responses were seen for RSV activated from NP cells by RAV 1 or RAV 2. All viruses of the avian leukosis complex which have been tested to date (i.e., avian myeloblastis virus, RPL 12 virus, several independent isolates of RAV, and the resistance inducing factor, RIF) are capable of activating RSV production from NP cells. The susceptibility of RSV to interference by leukemia viruses depends on the similarity between the coat of the leukemia virus and that of the super-infecting RSV. The results to date indicate both these forms of cellular resistance to RSV are associated with the failure of RSV to penetrate the cell. Experiments with chick embryos showed that all malignantly transformed cellular clones contain the RSV genome, and that transformation can occur without production of RSV. While the presence of the RSV genome in a cell is essential for malignant transformation, not all such cells transform. If this point could be confirmed, it would suggest that RAV can not only prevent infection of cells by RSV, but can also restrain RSV multiplication after RSV has gained a foothold in the cell and may thereby inhibit the malignant transformation. This would imply that the replication of the defective RSV genome is unrestrained in solitary infections, and that this unrestrained proliferation of the RSV genome is causally connected with the malignant transformation. See also CRA 1(2):#262; *ibid.*, 1(3):#506; *ibid.*, 1(12):#2059, 1964; *ibid.*, 2(1):#85; *ibid.*, 2(2):#282 and #283, 1965.

- 65-1505 CELL-CULTURE RESPONSE TO FIBROMA VIRUS. (E.) Verna, J. E. (Melpar Inc., Falls Church, Va.). *J. Bact.* 89(2):524-528, 1965.

The Shope rabbit fibroma virus (Patuxent strain) produced plaques in monolayer cultures of CRP cells, degeneration with the elongation of cells, and no aggregation formation in RbH cells, foci of cellular aggregates and no plaque formation in RbK cells. The number of characteristic lesions in each rabbit cell line was related to virus dilution. All cells seemed equally sensitive to the fibroma virus infection. No conclusive evidence has been established for a viral-induced proliferative effect in RbK cells.

- 65-1506 RECOVERY OF MYCOPLASMAS IN THE STUDY OF HUMAN LEUKAEMIA AND OTHER MALIGNANT

Girardi, A. J. (Wistar Inst., Philadelphia, Pa.), L. Hayflick, A. M. Lewis and N. L. Somerson. Proc. Natl. Acad. Sci. (U.S.A.) 205:188-189, 1965.

The Negroni agent obtained from human leukemia bone marrow as a 0.2 ml volume of infectious agent (see CRA 2(4):#720, 1964) was directly inoculated onto mycoplasma agar of Hayflick's medium. Mycoplasma at a conc. of 10^8 colony-forming U/ml were revealed. CPE in tissue culture produced by the mycoplasma isolates. Four mycoplasma agents (2 from a human hemangioma and a nasopharyngeal fibroma) have been identified as mycoplasmas by the authors as well as by A. Sabin and J. S. Horoszewicz (personal communication).

507 MUTATION STUDIES WITH MH2 RETICULO-ENDOTHELIOMA AND ROUS SARCOMA VIRUSES. Dhalliwal, S. S. (Inst. Anim. Genet., Poult. Ctr., Edinburgh, Scotland). Neoplasma (Lond.) 11(4):335-344, 1964.

MH2 reticuloendothelioma virus (MH2V) isolated from the chorioallantoic membrane (CAM) of chick embryos showed increased infectivity on CAM than virus derived from chicks, but this increased infectivity was lost after passaging the virus in cells, thus showing that the infectivity was a result of viral adaptation to CAM rather than a mutation. No ectodermal-specific variant of MH2V could be isolated. Proflavine (1 in 1000) failed to inactivate MH2V after 24 hr. The Rous sarcoma virus (RSV) was completely inactivated at pH 12 in 30 min.; at pH 11, approx. 25% of the virus survived. No pH-resistant variant could be isolated from these survivors. RSV was completely inactivated at 55°C, but no pure heat-resistant variant could be isolated. (See also CRA 1(1):#109, 1963.)

508 STUDIES ON THE INFECTIOUS NUCLEIC ACID FROM MOLONEY LEUKEMIA VIRUS. I. Inactivation of ^{32}P -LABELED RIBONUCLEIC ACID INTO RAT LIVER. (Jap.) Inoue, T. (Dept. Biochem., Nara Univ. Med., Japan), K. Masuda, S. Tanabe, T. Kamura and T. Ota. Nara Igaku Zasshi (J. Med. Assn.) 15(4):288-293, 1964.

supernatant obtained following centrifugation of tumor tissue homogenate of Moloney leukemia virus-infected Moloney leukemia viruses which were capable of inducing lymphatic tumors in the spleen, spleen and lymph nodes of newborn mice. Fractions extracted by phenol from the viruses were also capable of inducing such tumors. ^{32}P -labeled RNA (prepared from a regenerating rat liver) was inj. s.c. into the back of adult Wistar-Kyoto rats. Some of the labeled RNA was partially decomposed at the site of inj., while a portion was transported to other parts of the body in a high molecular state. The uptake of the RNA was rather high in the spleen and the thymus.

55-1509 ELECTRON MICROSCOPIC OBSERVATIONS OF VIRAL PARTICLES IN SPONTANEOUSLY OCCURRING MAMMARY CARCINOMA IN C3H STRAIN MICE. (Jap., Abstract) Ikeda, K. (Dept. Intern. Med., Japan), Y. Ota and N. Suzuki. Rinsho Byori (Jap. J. Clin. Path.) 12(7):380, 1964.

Electron microscopic observations of spontaneously occurring mammary carcinoma in C₃H strain mice showed initially virus particles as inclusion bodies in tumor cells. They were composed of two membranes and were round in shape (88 mμ in diameter). Occasionally "C" type particles were seen. "A" type particles gathered around the cell membrane or around vacuoles in the cytoplasm. The particles, still covered with the cell membrane, moved out of the cell and became mature virus particles. "B" type particles were about 120 mμ in diameter and contained nucleoids (about 60 mμ). The viroplasm was composed of 4 layers. The "B" type particles were seen in the glandular ducts and in the intercellular spaces.

65-1510 A MACROSCOPIC METHOD FOR COUNTING FOCI PRODUCED BY ROUS SARCOMA VIRUS IN VITRO. (E.) Siminoff, P. (Dept. Microbiol. Res., Bristol-Myers Co., Syracuse, N. Y.) and F. C. Reed, III. Virology 21:284-286, 1963.

65-1511 VARIATIONS IN DRUG SUSCEPTIBILITY AMONG MOLONEY VIRUS-INDUCED TRANSPLANTABLE LEUKEMIAS. (E.) Glynn, J. P. (NCI, Bethesda), A. R. Bianco and A. Goldin. Cancer Res. 24(8):1303-1307, 1964.

65-1512 IMMUNITY AGAINST ISOTRANSPLANTS OF RAUSCHER VIRUS-INDUCED LEUKEMIA. (E., Abstract) Bianco, A. R. (NCI, Bethesda), J. P. Glynn and A. Goldin. Proc. Am. Assn. Cancer Res. 5(1):5, 1964.

65-1513 ROSETTE-LIKE ARRANGEMENT OF POLYOMA VIRUS PARTICLES IN INFECTED MOUSE-EMBRYO CELLS. (E., Abstract) Mori, R. (Dept. Bact., Kyushu U. Sch. Med., Fukuoka, Japan), K. Amako and K. Takeya. J. Bact. 89(2):535, 1965.

65-1514 POLYOMA-VIRUS DEOXYRIBONUCLEIC ACID. (E., Abstract) Crawford, L. V. (Inst. Virol., U. Glasgow, Scotland). Biochem. J. 94(1):4P, 1965.

65-1515 CELL PROLIFERATION AND MIGRATION AS REVEALED BY RADIOAUTOGRAPHY IN RABBIT PAPILLOMAS INDUCED BY THE VIRUS OF SHOPE (SPV). (E., Abstract) Rashad, A. L. (Dept. Microbiol., U. Washington Sch. Med., Seattle). Proc. Am. Assn. Cancer Res. 6:52, 1965.

- 65-1516 ATTEMPTS AT CELL-FREE TRANSMISSION OF X-RAY INDUCED LEUKEMIA OF C57BL AND C3H MICE. (E., Abstract) Hodes, M. E. (Indiana U. Med. Ctr., Indianapolis), C. G. Palmer, J. A. Christensen and J. D. Hubbard. Proc. Am. Assn. Cancer Res. 6:29, 1965.
- 65-1517 VIRUS-LIKE PARTICLES IN ASCITES CELLS DERIVED FROM BENZOPYRENE-INDUCED SQUAMOUS CELL CARCINOMA OF THE MOUSE CERVIX. (E., Abstract) Greider, M. H. (Dept. Path., Ohio State U., Columbus) and D. G. Scarpelli. Proc. Am. Assn. Cancer Res. 6:24, 1965.
- 65-1518 CHARACTERISTICS AND MODE OF GROWTH OF A TISSUE CULTURE STRAIN (EB1) OF HUMAN LYMPHOBLASTS FROM BURKITT'S LYMPHOMA. (E.) Epstein, M. A. (Bland-Sutton Inst. Path., Middlesex Hosp. Sch. Med., London) and Y. M. Barr. J. Nat. Cancer Inst. 34(2):231-240, 1965.
- 65-1519 EFFECTS OF ROUS SARCOMA VIRUS ON CHICKEN-EMBRYO LIMB BUDS GRAFTED ONTO THE CHORIOALLANTOIC MEMBRANE. (E.) Dunkel, V. C. (Inst. Microbiol., Rutgers State U., New Brunswick, N. J.) and V. Groupé. J. Nat. Cancer Inst. 34(2):201-215, 1965.
- 65-1520 BURKITT TUMOR: TISSUE CULTURE, CYTOGENETIC AND VIRUS STUDIES. (E.) Stewart, S. E. (NCI, Bethesda), E. Lovelace, J. J. Whang and V. A. Ngu. J. Nat. Cancer Inst. 34(2):319-327, 1965.
- 65-1521 BIOLOGICAL SIGNIFICANCE OF FACTORS INFLUENCING THE INCIDENCE OF MAMMARY CANCER IN MICE. (E.) Murray, W. S. (Jackson Lab., Bar Harbor, Maine). J. Nat. Cancer Inst. 34(1):21-41, 1965.
- 65-1522 SEROLOGIC STUDIES ON CELLS OF GRAFFI VIRUS-INDUCED MYELOID LEUKEMIA IN MICE. (E.) Pasternak, G. (Inst. Exp. Cancer Res., German Acad. Sci. Berlin-Buch). J. Nat. Cancer Inst. 34(1):71-83, 1965.
- 65-1523 THE IMMUNE RESPONSE TO THE MOLONEY AND RAUSCHER VIRUSES PROPAGATED IN TISSUE CULTURE. (E., Abstract) Mayyasi, S. A. (Chas. Pfizer & Co., Inc., Maywood, N. J.) and L. M. Bulfone. Bact. Proc. 1965:109.
- 65-1524 NUCLEOSIDE KINASE ACTIVITY IN TISSUES INFECTED WITH ROUS SARCOMA VIRUS. (E., Abstract) Gelbard, A. S. (Sloan-Kettering Inst., New York, N. Y.), S. H. Kim and M. L. Eidinoff. Bact. Proc. 1965:107.
- 65-1525 SIMILARITY OF THE ADENOVIRUS TUMOR ANTIGEN WITH AN "EARLY PROTEIN" SYNTHESIZED IN TYPE 12 OR 18 VIRUS-INFECTED CELLS. (E., Abstract) Gilead, Z. (U. Pennsylvania, Philadelphia, Pa.) and H. S. Ginsberg. Bact. Proc. 1965:108.
- 65-1526 INDUCED EPITHELIAL HYPERPLASIA IN ORGAN CULTURES OF MOUSE MAMMARY TISSUES. EFFECTS OF THE MILK AGENT. (E.) Lasfargues, E. Y. (Dept. Microbiol., Columbia U. Coll. Phys. Surg., New York, N. Y.), M. R. Murray and D. H. Moore. J. Nat. Cancer Inst. 34(1):141-152, 1965.
- 65-1527 FINE STRUCTURAL ORGANIZATION OF HUMAN LYMPHOBLASTS OF A TISSUE CULTURE STRAIN (EB1) FROM BURKITT'S LYMPHOMA. (E.) Epstein, M. A. (Bland-Sutton Inst. Path., Middlesex Hosp. Sch. Med., London) and B. G. Achong. J. Nat. Cancer Inst. 34(2):241-253, 1965.
- 65-1528 JOINT ACTION OF HERPES SIMPLEX VIRUS AND 3-METHYLCHOLANTHRENE IN PRODUCTION OF PAPILLOMAS IN MICE. (E.) Tanaka, S. (Div. Virol., Mem. Sloan-Kettering Cancer Ctr., New York, N. Y.) and C. M. Southam. J. Nat. Cancer Inst. 34(4):441-451, 1965.
- 65-1529 STUDIES OF EXPERIMENTAL TRANSMISSION OF LEUKEMOGENIC VIRUS INFECTION IN MICE. (E.) Law, L. W. (NCI, Bethesda). J. Nat. Cancer Inst. 34(4):543-549, 1965.
- 65-1530 STUDIES OF AVIAN SARCOMA AND ERYTHROBLASTOSIS (STRAIN 13). III. EFFECT OF CHICK SEX ON VIRUS SUSCEPTIBILITY. (E.) Wallis, A. M. (U. Pennsylvania Sch. Vet. Med., Kennett Sq.) and E. L. Stubbs. J. Nat. Cancer Inst. 33(5):807-811, 1964.
- 65-1531 SEARCH FOR A FILTERABLE AGENT ASSOCIATED WITH OSTEOGENIC SARCOMA IN MICE. (E., Abstract) Finkel, M. P. (Argonne Nat. Lab., Ill.), B. O. Biskis and P. B. Jenkins. Proc. Am. Assn. Cancer Res. 6:19, 1965.
- 65-1532 STUDY OF B PARTICLES IN THE MAMMARY TUMORS OF DIFFERENT MOUSE STRAINS. Hairstone, M. A., (Rockefeller Inst., New York, N. Y.), J. B. Sheffield and D. H. Moore. J. Nat. Cancer Inst. 33(5):825-836, 1964.
- 65-1533 ON THE SIGNIFICANCE OF VIRUS-LIKE PARTICLES IN MAMMARY TISSUES OF C3H MICE. (E.) Pitelka, D. R. (Dept. Zool., U. of Berkeley), H. A. Bern, S. Nandi and K. B. DeOliveira. J. Nat. Cancer Inst. 33(5):867-885, 1964.

- 534 VIRUS PARTICLES IN THE NERVE OF REMAK OF CHICK EMBRYOS. (E.) Di Stefano, (Dept. Anat., State U. New York, Syracuse) and R. M. Dougherty. J. Nat. Cancer Inst. 33(6): 334, 1964.
- 535 SUBMICROSCOPIC PARTICLES IN NORMAL BOVINE AND HUMAN MILKS: A PRELIMINARY HISTOLOGICAL SURVEY. (E.) Jensen, E. M. (Smith Cancer Res., Chas. Pfizer & Co., Inc., New York, N. J.) and G. Schidlovsky. J. Nat. Cancer Inst. 33(6):1029-1053, 1964.
- 536 VIRUS-LIKE PARTICLES IN COW'S MILK FROM A HERD WITH A HIGH INCIDENCE OF RHINOSARCOMA. (E.) Dutcher, R. M. (South Jersey Cancer Res. Found., Camden), E. P. Larkin and R. R. Mack. J. Nat. Cancer Inst. 33(6):1055-1064, 1964.
- 537 ON THE TRANSMISSION OF THE LACTIC DEHYDROGENASE FROM MOTHER TO OFFSPRING. Crispens, C. G., Jr. (Dept. Anat., U. Maryland Sch. Med., Baltimore). J. Nat. Cancer Inst. 34(3):331-336, 1965.
- 538 THE RING FORMS OF THE DNA OF POLYOMA VIRUS. (E., Abstract) Laipis, P. (California Inst. Tech., Pasadena), J. Lebowitz, J. Vinograd and R. Watson. P. 51 Abstracts, Biophysical Soc., 9th Ann. Meet., 1965, San Francisco, Cal. (Biophys. J. 51, 1965).
- 539 VIRUS STUDIES WITH GERMFREE MICE. I. PREPARATION OF SEROLOGIC DIAGNOSTIC REAGENTS AND SURVEY OF GERMFREE AND MONOCONTAMINATED MICE FOR INDIGENOUS MURINE VIRUSES. (E.) Tennant, R. W. (NCI, Bethesda), R. W. Tennant, J. C. Ward and W. P. Rowe. J. Nat. Cancer Inst. 33(3):371-380, 1965.
- 540 VIRUS STUDIES WITH GERMFREE MICE. II. COMPARATIVE RESPONSES OF GERMFREE MICE TO VIRUS INFECTION. (E.) Tennant, R. W. (NCI, Bethesda), R. W. Tennant, J. C. Ward, J. C. Parker and T. G. Ward. J. Nat. Cancer Inst. 34(3):381-387, 1965.
- 541 THE ROLE OF THYMUS IN TRANSPLANTATION RESISTANCE INDUCED BY POLYOMA VIRUS. (E.) Ting, R. C. (NCI, Bethesda) and L. W. Law. J. Nat. Cancer Inst. 34(4):521-527, 1965.
- 542 POLYOMA VIRUS AND L CELL RELATIONSHIP. II. A CURABLE CARRIER SYSTEM NOT DEPENDENT ON INTERFERON. (E.) Hare, J. D. (Dept. Microbiol., U. Rochester Sch. Med., N. Y.) and H. R. Morgan. J. Nat. Cancer Inst. 33(5): 765-775, 1964.
- 65-1543 EXCRETION OF SV-40 VIRUS AFTER ORAL ADMINISTRATION OF CONTAMINATED POLIO VACCINE. (E.) Horváth, B. L. (State Inst. Hyg., Budapest, Hungary) and F. Fornosi. Acta Microbiol. Acad. Sci. Hung. 11(3):271-275, 1964-1965.
- 65-1544 POTENTIATION OF ADENOVIRUS ONCOGENICITY BY SV-40 VIRUS. (E., Abstract) Schell, K. (NIH, Bethesda), R. J. Huebner, W. T. Lane and M. J. Casey. Bact. Proc. 1965:109.
- 65-1545 RELATIONSHIP BETWEEN SPECIFIC COMPLEMENT-FIXING AND INTRANUCLEAR ANTIGENS IN SV40-INDUCED TUMORS. (E., Abstract) Kitahara, T. (Baylor U. Coll. Med., Houston, Tex.), J. L. Melnick and F. Rapp. Bact. Proc. 1965:108.
- 65-1546 POSSIBLE RELATIONSHIP BETWEEN TWO PRIMATE PAPOVAVIRUSES, HUMAN WART AND SIMIAN SV40. (E.) Melnick, J. L. (Dept. Virol., Baylor U. Coll. Med., Houston, Texas) and F. Rapp. J. Nat. Cancer Inst. 34(4):529-534, 1965.
- 65-1547 LOCALIZATION AND NATURE OF SV40 INDUCED COMPLEMENT-FIXING ANTIGEN IN HUMAN CELLS. (E., Abstract) Gilden, R. V. (Wistar Inst., Philadelphia, Pa.), R. I. Carp and V. Defendi. Proc. Am. Assn. Cancer Res. 6:22, 1965.
- 65-1548 EFFECT OF HOST WEIGHT LOSS UPON FRIEND LEUKEMIA VIRUS INFECTIONS IN MICE. (E., Abstract) Sidwell, R. W. (Southern Res. Inst., Birmingham, Ala.), S. M. Sellers, C. Maxwell, G. J. Dixon and F. M. Schabel, Jr. Bact. Proc. 1965:114.
- 65-1549 DELTA AMINO LEVULINIC ACID DEHYDRASE (DALAD) ACTIVITY IN FRIEND VIRUS-INFECTED MICE. (E., Abstract) Tengerdy, R. P. (Colorado State U., Fort Collins). Bact. Proc. 1965:107.
- 65-1550 IN VITRO CULTIVATION AND TRANSPLANTATION IN MICE OF VIRUS-FREE FRIEND VIRUS-INDUCED ASCITES TUMORS. (E., Abstract) Fieldsteel, A. H. (Stanford Res. Inst., Menlo Park, Cal.) and J. Scholler. Proc. Am. Assn. Cancer Res. 6:19, 1965.

See also abstract nos.: 1314, 1316, 1325, 1339, 1340

65-1551 CANCER MORTALITY IN ZONES WITH ARSENICAL WATERS IN THE PROVINCE OF CORDOBA, ARGENTINA. (Sp.) Bergoglio, R. M. (396 Colon Ave., Cordoba, Argentina). Prensa Med. Argent. 51(17):994-998, 1964.

Cancer mortality was investigated in a 7,500 square km area of the province of Cordoba, Argentina, southeast of the Mar Chiquita, where the population drinks artesian well water with a high arsenic content. During the yr. 1949-59, 23.84% (556/2,355) of all deaths were due to cancer (372 in men, 183 in women); the av. age was 58.1 yr. The percentage distribution by site was: buccal cavity and pharynx 1.2; digestive tract and peritoneum 35; respiratory system 35; uterus 2.9; other female genital organs 0.7; breast 1.9; male genital organs 0.5; urinary system 11.1; skin 2.3; brain and other parts of the nervous system 1.7; unspecified 6.4. In certain departments within this zone cancer mortality was 34.89% of all deaths while the av. for the whole province of Cordoba was 15.3% (21,276/137,702). In zones whose standard of living (social and economic) and medical conditions were similar to those observed in the areas with arsenical waters but whose waters were arsenic-free, cancer mortality was as low as 10.3%.

65-1552 EPIDEMIOLOGY OF CANCER IN HAWAII. (THIS REPORT COVERS STUDIES ON THREE DIFFERENT CANCER SITES.) (E.) Quisenberry, W. B. (Hawaii State Dept. Health, Honolulu). Med. Arts Sci. 18(2):54-62, 1964.

Ethnic differences in the incidence rate of cancer of various sites in Hawaii were studied in a comparison of statistics obtained from an 8 yr. survey (1947-54) of hospital records (1,991 cancer cases) and from the Hawaii Tumor Registry figures (1,086 cases) for the yr. 1960. For cancer of the stomach, the crude rates/100,000 population for 1947-54 and 1960, resp., were as follows: for Japanese--36.9 and 48.9 in males (+33% change), 14.6 and 15.5 in females (+6% change); for Caucasians--14.3 and 14.2 in males (-1% change), 7.9 and 9.0 in females (+14% change); for Hawaiians and part-Hawaiians--14.2 and 32.7 in males (+134% change), 8.9 and 10.9 in females (+35% change). Comparable figures for cancer of the bronchus and lungs were as follows: for Japanese--9.2 and 20.0 in males (+117% change), 2.1 and 6.8 in females (+224% change); for Caucasians--14.6 and 19.5 in males (+34% change), 3.1 and 3.4 in females (+10% change); for Hawaiians and part-Hawaiians--8.0 and 30.9 in males (+286% change), 2.0 and 7.3 in females (+265% change). For breast cancer in women only, the following figures were reported: 8.2 and 18.4 (+124% change) among Japanese; 39.7 and 40.3 (+2% change) among Caucasians; 15.6 and

21.8 (+40% change) among Hawaiians and part-Hawaiians. Among the sociocultural and etiologic factors discussed are hot foods, alcoholic beverages, nutrition (lack of vitamin B₁) and high incidence of blood group A in stomach cancer pts. smoking habits in lung cancer pts.; nursing habits in breast cancer pts. (See also CRA 1(2):#324, 1963 and ibid., 3(3):#599, 1965.)

65-1553 CIRRHOSIS AND CARCINOMA OF THE PROSTATE GLAND. (E.) Glantz, G. M. (Presbyt. Hosp., New York). J. Urol. 91(3):291-293, 1964.

The incidence of prostatic carcinoma (PC) was 3.3% among cirrhotics (Ci; 18/550 autopsied cases and 9.0% in a control group without cirrhosis (Co; 59/650 autopsied cases). The Co group showed a gradual increase in PC incidence for each advancing 10 yr. age group; this gradual increase with age was not evident in the Ci pts. The incidences in the various age groups were: 45-54--Ci 3/142, Co 0/143; 55-64--Ci 5/222, Co 20/233; 65-74--Ci 9/163, Co 23/184; 75-90--Ci 1/23, Co 16/90. It was suggested that the hyperestrogenic accompanying cirrhosis may prevent or at least delay the development of PC.

65-1554 MALIGNANT LYMPHOMA IN SURVIVORS OF THE ATOMIC BOMB IN HIROSHIMA. (E.) Anderson, R. E. (Dept. Path., Atom. Bomb Casualty Comm., Hiroshima, Japan) and K. Ishida. Ann. Intern. Med. 61(5)(Pt. 1):853-862, 1964.

Studies performed in Hiroshima between 1949-1962 on 91 cases of histologically confirmed (autopsy or biopsy) malignant lymphomas indicated an incidence of Hodgkin's disease, lymphosarcoma and multiple myeloma which was 2.7x higher in a group proximally exposed to the bomb (less than 1400 from the hypocenter) than in a distally exposed (1400-10,000 m from the hypocenter) or non-exposed group, and 2x higher than that in the general population of Japan. Though the occurrence of reticulum cell sarcoma appeared to be decreased in the proximally exposed group, the epidemiological data support a general increase in the prevalence of the lymphomas in this group. No morphologic differences attributable to radiation could be found in exposed and non-exposed individuals between Hodgkin's disease, lymphosarcoma, reticulum cell sarcoma and multiple myeloma. (See also CRA 1(12):#2074, 1964; and ibid., 3(4):#707, 1965.)

65-1555 THE FREQUENCY OF BRAIN TUMORS. (Sp.) Gonzalez Fera, L. (Inst. Neurosurg., Santa Cruz de Tenerife, Spain). Rev. Clin. Esp. 94(3):226-228, 1964.

In the city of Gothenburg, Sweden, (400,000

ation) there were 172 brain tumors diagnosed during the yr. 1957, 1958 and 1959 to give a frequency (per 100,000) of 14.3; if metastatic tumors of clinical significance were excluded, frequency was 11.4. Gliomas constituted 50% (72) of all brain tumors with a male:female ratio of 2:1. The remaining tumors were metastatic (20%), meningiomas (17%), neurinomas (6%), others (5%); these tumors were equally distributed in the two sexes except for neurinoma in which there were 3 male and 5 female cases. The chance of developing brain tumors increased with age and was highest in the decades 50-70 yr.

56 EPIDEMIOLOGY OF LEUKEMIA MORTALITY IN MICHIGAN, 1950-1960. (E.) Smith, (U. Michigan Sch. Public Health, Ann Arbor), Rupke and W. J. Dewey. J. Mich. Med. Soc. 81:861-865, 1964.

Number of leukemia deaths and the proportion of total deaths from leukemia were as follows: lymphatic (LL), 1,667 and 31%; for myeloid leukemia, 1,271 and 23.6%; for monocytic, 561 and 9.5%; for other and unspecified, 1,887 and 35%. Childhood leukemia is almost always acute, usually lymphoblastic or "stem-cell". Young adults and middle-aged persons are affected by LL and with about equal frequency. LL seems to increase during the fourth and fifth decades, while after age 70 it again becomes the most common leukemia. Mortality reaches a peak in the <5 and 5-14 age groups. A higher death rate generally exists in males and among whites. For the yr. 1961, the generally observed trend toward decreasing urban leukemia incidence rates was moderately and non-significantly reversed. An attempt to discover "outbreaks" of leukemia in specific areas of Michigan revealed no significant variations. Overall, in Michigan the leukemia mortality rate (per 100,000 population) has increased from 4.2 in 1940 to 6.6 in 1960.

57 LOCAL VARIATION IN THE INCIDENCE OF LUNG CANCER AND BRONCHITIS MORTALITY. Gollidge, A. H. (Dept. Health, N. Riding, Northshire, England) and A. J. Wicken. Med. J. Aust. 112(20):273-277, 1964.

Increased mortality rates (per 100,000) in urban areas (Eston and Stockton-on-Tees) compared to rural districts appeared to be correlated with increased urban air pollution rather than smoking habits and social class distribution. Over the period 1952-1962, the av. lung cancer mortality rate in Eston of those age 35 yr. or over was 15 for men and 15 for women. Standardized lung cancer mortality ratios for the period 1960-1962 showed the male rate in Eston to be 40% higher than that prevailing in England and Wales. The standardized cancer mortality rate for men 40 yr. or older who smoked more than 23 cigarettes/day was 661 in Eston, 418 in Stockton-on-Tees and 167 in the rural districts, compared to rates

in nonsmokers of 20, 25 and 29, resp. The results of these studies indicate that lung cancer is more closely associated with smoking habits than with the level of air pollution, though some correlation with the latter was noted.

65-1558 GEOGRAPHY AND POPULATION SELECTION OF RENAL AND HEPATIC CARCINOMA AND CIRRHOSIS. (E.) Higginson, J. (U. Kansas Med. Ctr., Kansas City). Fed. Proc. 23(6)(Pt. 1):1346-1348, 1964.

The literature regarding the incidence of renal carcinoma is reviewed and compared with the data on liver carcinoma and cirrhosis previously reported in CRA 2(4):#757, 1964. No correlation could be found between primary renal and hepatic carcinoma which would indicate a common causative factor. The highest frequency of renal carcinoma occurred in the industrialized countries of North America and Europe, whereas the lowest frequency was found in countries having a high incidence of primary liver carcinoma. The frequency of nephroblastoma did not vary significantly in the different countries. It is believed that renal carcinoma may be related to the economic level of the community in which it occurs.

65-1559 CHANGES IN THE CANCER RISK IN SWITZERLAND IN THE LAST DECADE. (Ger.) Schinz, H. R. (78 Kurhaus St., Zurich, Switzerland) and T. Reich. Schweiz. Med. Wschr. 94(50):1741-1743, 1964.

The changes in the carcinoma (C) risk (R) in Switzerland over the yr. 1952-62 are discussed. The absolute number of C deaths had increased for both males (M; >10%) and females (F; >5%) as a result of the age alteration of the population. C deaths/10,000 living persons is decreased for all sites and all ages. CR decreased also. In gastric C, R was decreased for M and F of all age groups. Bronchial CR in M is increasing, although at a slower rate than previously, while it is decreasing for F. Esophageal CR in M continues to decrease, while that of prostate increases in the older age group and decreases in the younger age group. Mammary CR in F showed only a slight increase, while that of uterine C showed a decrease. The theory of a "simulated" age disposition is further maintained: this theory states that not the age, but the amount of the individual carcinogenic dose per unit at time is responsible for the appearance of cancer.

65-1560 A CASE OF CANCER OF THE BREAST WITH FAMILIAL INCIDENCE. (It.) Nigro, R. (Senatore Pascale Found., Naples, Italy) and A. Marone. Boll. Fond. Pascale Tumori 10(1-2):1-6, 1963.

Described is a family in which the mother and 3 daughters died of mammary carcinoma while a fourth

daughter is affected by the same disease.

- 65-1561 CHANGING SEX DIFFERENTIALS IN LEUKEMIA. (E.) Fraumeni, J. F., Jr. (NCI, Bethesda) and J. K. Wagoner. Public Health Rep. 79(12):1093-1100, 1964.

The mortality sex ratios (SR; male-to-female death rates) were tabulated for eight 5 yr.-periods from 1921 to 1960 in the U.S. There was a significant decrease for childhood age groups and an increase for age groups over 24 yr. which was significant between 35 and 74 yr. A consistent bimodal curve for the SR was demonstrated, with the first peak at the age of 5-24 yr. and the second peak above the age of 64. These SR trends appeared only among whites; however, there were relatively few nonwhites in the population studied. Rising leukemia trends were also observed in England and Wales and similar SR slopes were found as among the U.S. whites. A comparison was made of the U.S. white males and females according to the "relative" and "absolute" increases which had occurred in age-specific leukemia death rates. In adult leukemia (1921-60, U.S.), both the absolute and relative rises in mortality were greater for males than females, and it was concluded that males may be selectively affected by increasing leukemogens in the environment.

- 65-1562 SOME EPIDEMIOLOGIC ASPECTS OF SKIN CANCER. (E.) Macdonald, E. J. (Dept. Epidemiol., U. Texas M. D. Anderson Hosp., Houston) and E. Bubendorf. Pp. 23-65 in Tumors On The Skin. Cumley, R. W., J. McCay, D. Aldridge, S. Connelly, J. Haroz, A. Reiner and W. White (Eds.). Year Book Med. Publ., Inc., Chicago, 1964, 322 pp.

Of 30,000 cancer pts. seen at the University of Texas M. D. Anderson Hospital and Tumor Institute, nearly 25% have had primary skin cancer. A total of 14,383 skin cancer lesions (excluding melanoma) was found in 5,840 individuals (4,148 males, 1,692 females); 1351/5840 had a total of 1,529 primary cancers other than skin cancers (representing all areas of the body). When related to the total population, the total cases in this study represent 1/2,000 individuals of the state. Multiple primary cancers of the skin were present in 46.8% males and in 31.4% females. The incidence rate of second skin primaries is at least 140 times that of first primaries. Less than 10% of the lesions metastasized. The distribution, histology, and time elements in the development of lesions are tabulated extensively by sex, ethnic group, and age. Those with multiple skin cancers were younger when their first cancer developed than those who had only 1 lesion. As to type, 60% were basal cell, 33% were squamous cell. There were also 22 squamous cell carcinomas of the Marjolin's ulcer type. While Negroes constitute 12.5% of the population, only 1.5% of the skin cancers occurred among them;

relatively less skin cancer occurred in the Latin American population. A family history of skin cancer was found in more than 10% of pts., and knowledge of this familial history increased with the number of lesions the individual had. As to occupation, incidence was highest among farmers (23%) and housewives (1158/5840). The age-adjusted death rates for 20 yr. (1940-60) for skin cancer in each of the states and the U.S. as a whole show a decrease in every state but Delaware with wide variations in the rate of decrease (average yearly decrease for U.S. 0.05/100,000).

- 65-1563 TUMOR MORTALITY IN THE COMMUNITY OF CARRARA WITH PARTICULAR REGARD TO MORTALITY FROM TUMORS OF THE LUNGS. (It.) Barghini, G. (Dept. Hygiene, Carrara, Italy). Ann. Sanit. Pubblica 25(4):795-806, 1964.

In the community of Carrara (Italy) in 1951 cancer accounted for 13.29% of all deaths and lung cancer (LC) for 0.36%; in 1961 similar figures were 17.72 and 3.48%, resp. Comparable figures for the whole province were 14.03 and 0.55 in 1951 and 18.61 and 2.16 in 1961; for the whole region (Toscana) 17.24 and 0.69 in 1951 and 21.7 and 1.8 in 1961; for the whole country 11.83 and 0.62 in 1951 and 16.56 and 1.67 in 1961. In Carrara 20 people (13 men, 7 women) died of LC during 1945-53 and 125 (120 men, 5 women) during 1954-1963 (while the population increased only 6-7% during 1951-61); the majority of the pts. were >45 yr. of age. During both periods LC was higher among marble workers (7/20 and 54/125, resp.). An analysis of the geographic distribution within the community of Carrara of LC mortality (per 100,000 population) during 1954-62 showed higher figures for people living close to the industrial zone (24.62) than in the city (19.71), seashore (21.1) or mountains (10.0). Several factors (tobacco smoking, air pollution, climatic conditions, etc.) were analyzed in relation to the increased LC incidence but no definite conclusions were drawn.

- 65-1564 TUMORS OF THE BLADDER AND URETHRA ASSOCIATED WITH URINARY RETENTION IN UGANDA AFRICANS. (E.) Dodge, O. G. (Dept. Pat. U. Sheffield, England). Cancer 17(11):1433-1437, 1964.

Among 83 cases (76 male, 7 female) of histologically confirmed bladder tumors registered in the Kampala Cancer Registry between 1952-60, there was evidence of long-continued urinary stasis in 29 (all due to urethral stricture or its consequences). Eighteen had longstanding suprapubic cystostomies; 8 tumors arose in the cystostomy area. In the same period, there were 19 carcinomas of the urethra and there was good evidence that at least 4 had had urethral stricture for several yr. The bladder-urethra cancer ratio in Uganda is less than 5:1 whereas in Europeans it is about 40:1.

565 THE GEOGRAPHICAL PATHOLOGY OF LEUKAEMIA IN SINGAPORE. (E.) Muir, C. S. (Dept. , U. Singapore, Malayasia). Path. Microbiol. 27(5):760-766, 1964.

Singapore leukemia morbidity and mortality for 1948-1959 inclusive were estimated on the basis of 11 leukemic cases admitted to Singapore hospitals (162 persons, 4% of all cancer cases treated). The overall yearly rates (adjusted to the standard population of Segi, 1960) were 4.5 per 100,000 males and females, resp. The death rates for leukemia were 3.9 and 3.1, resp. Among the 1,176 autopsies performed in Singapore in 1948-59 on persons with malignant disease, 78 (6.6%) cases were leukemia, ranking fifth after cancer of the liver, lung, stomach, and esophagus. Age and race variations and corresponding customs may bias the statistical estimations in this area.

566 BETEL NUT CHEWING AND MOUTH CANCER IN TAIWAN. I. SURVEY OF DISPOSITION OF MOUTH CANCER IN TAIWAN. (E.) Chang, K. M. (Dept. Surg., Nat. Taiwan U. Coll. Med., Taipei, Taiwan). J. Formosa Med. Assn. 63(9):437-448, 1964.

Among 89 cases of oral cancer (71 male, 18 female; 18-75 yr., av. 46.5 yr.) observed in 1953-1963 at the National Taiwan University Hospital, 50% consisted of epidermoid carcinomas, 3.3% squamous cell carcinoma; 4 (4.6%) cases were diagnosed as leukoplakia. Incidence as to sites: tongue, 34; gingival and buccal, 16 each; floor of mouth, 9; palate, 7; lips, 2; tonsil, 1. Possible carcinogenic factors were ascertained as follows: venereal disease in 28%; smoking in 53%; wine consumption in 53%; spicy diet in 41%; betel nut chewing in 59%; dentures and caries in 10%. An extensive discussion of the various effects of the use of betel nuts is included.

567 THE INCIDENCE OF LEUKEMIA IN HIROSHIMA DURING THE PAST 18-YEAR-PERIOD, 1946-1963. (Jap., Abstract) Watanabe, S. (Dept. Surg., Hiroshima U. Sch. Med., Japan), F. Hirose, M. Okoji and S. Takizawa. Nippon Ketsueki Gakkai Shi (Acta Haemat. Jap.) 27(2-3):312, 1964.

In Hiroshima, 15 additional cases of leukemia (4/100,000 general population) developed during 1963. Six out of the 15 were exposed to the atomic blast within 5,000 m of the hypocenter, constituting 6.31/160,000 exposed within the same distance. The incidence of leukemia has been steadily declining in recent yr. The total cumulative number of leukemias in Hiroshima during the past 18 yr. is 303 (which includes 111 acute, 79 chronic); 190/303 occurred among those bomb-exposed (10.84/100,000 exposed). (See CRA 3(2):#326, 1965.)

65-1568 EARLY DETECTION OF CARCINOMA OF THE LUNG THROUGH MASS MEDICAL EXAMINATION OF INHABITANTS. (Jap.) Kagetsu, H. (Lung Cancer Res. Inst., Chiba U. Sch. Med., Japan) and J. Matsuoka. Sogo Rinsho (Clin. All-Round) 14(1):50-56, 1965.

In Goi District, Chiba Prefecture, annual mass medical examination of 259,794 (93.7%) inhabitants was conducted during the period 1958-1963 for the early detection of lung carcinoma. School children and workers were excluded because they have regular medical checkups. Of this, 53.6% were above age 40. Carcinoma of the lung was detected in 20 individuals (10 males and 10 females), or an av. of 8.4 per 100,000 (4.5-14.9). All the lung carcinoma pts. were above 40.

65-1569 A SCREENING CAMPAIGN FOR CARCINOMA OF THE STOMACH. (AN INTERMEDIATE REPORT.) (Jap., Abstract) Matsui, Y. (Anti-Cancer Assn., Mie Pref., Japan), S. Nomura and S. Sobu. Mie Igaku (J. Mie Med. Assn.) 8(1):66-67, 1964.

In a mass medical checkup for the detection of carcinoma of the stomach in Mie Prefecture during the 3-year-period 1961-63, the incidence was 6/20,833.

65-1570 A EPIDEMIOLOGICAL SURVEY OF CARCINOMA OF THE STOMACH IN MIE PREFECTURE. PARTICULARLY IN THE ISE DISTRICT. (Jap., Abstract) Nomura, S. (Public Health Ctr., Ise, Japan). Mie Igaku (J. Mie Med. Assn.) 8(1):66, 1964.

In an extensive survey of death rates due to malignancies in 11 cities and towns in Mie Prefecture during a period of 11 yr. ending in 1961, areas of high death rates were found such as Kise-machi and Kashiwazaki districts (standardized death rate of 123.9) and Tamaki-cho (rate 87.4) and also areas with low death rates (Ouchiyamamura, 48.2; Komato-cho, 67.5). On the basis of extensive studies of environmental and various endogenous and cultural factors, it was concluded that high death rates due to malignancies were correlated with high soil acidity and certain nutritional factors (increased intake of salt and carbohydrates; low intake of vitamins B₁ and B₂, animal proteins, fat, and calcium; high consumption of cereals, canned fish, "tsukudani" (seaweed), "miso" (soy bean product), soy sauce, dried fish and dark green vegetables; and low ingestion of poultry, milk, butter, "tofu" (bean cake), fried foods, and fruits). Smoking, alcohol intake and blood relatedness were not related to the high death rates.

65-1571 THE MONTHLY INCIDENCE OF LEUKEMIA AMONG ATOMIC BOMB SURVIVORS IN HIROSHIMA AND NAGASAKI. (Jap., Abstract) Yamada, J. (Atom Bomb Casual. Comm., Hiroshima, Japan), T. Hoshino,

K. Itogo and N. Toyoda. *Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.)* 27(2-3):274, 1964.

In a study of a total of 638 cases of leukemia and 419 cases of lymphoma and other related tumors accumulated in Hiroshima and Nagasaki during the period 1946-1961, a significant difference between the expected and the actual monthly incidences ($P < .05$) was noted for leukemia but not for the lymphomas. The monthly incidences of leukemia showed significant deviations from mo. to mo. in Nagasaki ($P < .05$). The incidence of leukemia was significantly low in November in Hiroshima and in October in Nagasaki. No significant differences were seen considering total females and males but some differences were noted for females in individual cities. Among those exposed to the atomic blast within 2,000 m of the hypocenter, the expected and actual av. monthly incidences of leukemia showed a significant deviation. The incidence of leukemia in this group was particularly high in August. An analysis of the total of 3,454 cases of leukemia seen in Japan during the period 1956-61 showed no significant variation related to the 4 seasons for the 1,858 cases of acute leukemia. However, when the cases in spring and summer were combined, incidence was significantly higher than in the combined fall and winter group. In a total of 1,519 cases of acute myeloid leukemia, similar trends were noted.

65-1572 LEUKEMIA AND GAMMA-GLOBULIN GROUPS Gm AND Inv. (Fr.) Ropartz, C. (Cent. Dept. Blood Transfus., Rouen, France), R. Audran, L. Rivat, P. Y. Rousseau and J. M. Fine. *Vox Sang.* 8:627-631, 1963.

The determination of γ -globulin groups Gm and Inv in 84 pts. with leukemia (acute 31; myeloid 23; lymphoid 30) showed the following: no significant difference in the distribution of groups Gm(a), Gm(b) and Gm(x) among the different leukemias; same frequency of the 5 Gm phenotypes in leukemic and normal pts.; the factor Gm(b) is not a single factor, but a combination of factors; the distribution of Gm(e) in leukemic pts. is the same as that in the white, non-pathologic population; an increased frequency was noted for phenotype Inv(1+a-), due in part to increased frequency of Inv(1) among myeloid leukemia pts. (43.47%) and decreased frequency among lymphoid leukemia pts.

65-1573 THE DISTRIBUTION, FREQUENCY AND FORMS OF LEUKEMIA OBSERVED AT THE INSTITUTE OF PATHOLOGICAL ANATOMY OF THE UNIVERSITY OF ROME. (It.) Ajello, L. (Inst. Path. Anat., U. Rome) and S. De Marco. *Gior. Ital. Pat.* 10(4):193-205, 1963.

In a survey (5 yr.; 1957-61) conducted at the Institute, 146 cases of leukemia (2%) were seen in 7,095 autopsies. A significant increase was

noted for 1961. According to leukemia type, the highest incidence was seen for acute leukemia (62.3%), while that for chronic myeloid and lymphoid was 21.2% and 16.4%, resp. The disease was more frequent in males than females and in the 1-10 yr. and 40-60 yr. age groups.

65-1574 CONTRIBUTION TO THE STUDY OF LEUKOSES IN DOGS. (Fr.) Jacquier, C. *Schweiz. Arch. Tierheilk.* 105:208-223, 1963.

In a period of 8 yr. (1955-62), 15 cases of leukosis in dogs were observed. The dogs were of various breeds, age <8-12 yr. and of both sexes (8 male, 7 female). Histological classification included 6 lymphosarcomas (1/6 probable), 5 lymphadenoses, 3 myeloid leukemias, (1/3 with ovarian tumor) and 1 reticulum cell sarcoma of the spleen. Two of the dogs had parents which died of leukemia.

65-1575 PATHOLOGY OF ORBITAL-OCULAR TUMORS IN TROPICAL AFRICA. OBSERVATIONS BASED ON A STATISTIC OF 195 CASES OF MALIGNANT TUMORS (Ger.) Quéré, M. A. (Pasteur Inst., U. Dakar, Senegal), R. Camain and D. Lambert. *Klin. Mbl. Augenheilk.* 144(6):829-840, 1964.

In this study of 195 cases, 3 tumor types predominated: epitheliomas of the conjunctival and limbal areas (44; 36 spinocellular, 5 differentiated); tumors of the retina (R; 47 retinoblastoma, 10 retinocytoma); and hematologic sarcoma (HS; 40 reticulum cell sarcoma, 1 lymphogranuloma (Hodgkin's disease) and 2 orbital "plasmocytoma comas". In the R group, two-thirds were under age 4 yr. and two-thirds were boys. In the HS group, all the children were younger than 15 yr. Recently different types of reticulum cell sarcomas have been classified as "Burkitt's disease". Stress is placed upon the histologic polymorphism of these tumors and the unusually high incidence of these rare tumors.

65-1576 THE PROBABILITY OF INCIDENCE OF RETINOBLASTOMA IN CHILDREN FROM FAMILIES IN WHICH THIS DISORDER HAS OCCURRED. (Dut.) Hemme, G. D., R. Nihland and J. Schappert-Kimmijser. *Nederl. T. Geneesk.* 108(40):1906-1908, 1964.

The absolute incidence of retinoblastoma in The Netherlands during the past 30 yr. is estimated as 1/15,000 live births. In the light of data derived from a total of 550 pts. with reasonably complete family histories, the probability of incidence in junior siblings among pts. from families otherwise free of the disorder was approx. 1/100. Among 68 of this study group who had only a unilateral process, 58/68 had a total of 135 offspring, all of them free of the disorder; 10/68 had a total of 42 offspring, of whom 16/42 developed retinoblastomas. Among 7 with a bilateral process 2 had a total of 4 offspring, all of the

free of the disorder; 5/7 had a total of 18 offspring, of whom 12/18 were affected.

5-1577 CLINICAL AND STATISTIC REPORT OF THE ACTIVITY OF THE "FEDE FOCARDI VALLETTA" CENTER FOR MASS UTERINE CANCER DETECTION FOR THE YEARS 1962-1963-1964 (JANUARY-MAY). (It.) Med. Soc. (Torino) 14(9):293-300, 1964.

A total of 6,690 pts. were observed at the Center in Turin. Among cases with "erosion of the portio" where malignancy was suspected, 13% had carcinomas (microcarcinoma (MC) and carcinoma *in situ* (CS)) while only 0.3% of the cases which were not regarded suspicious had carcinomas (prevalence of CS). Among factory workers without symptoms, 0.3% had carcinomas (prevalence of CS); 0.6% of occasional pts. without symptoms had carcinomas (prevalence of MC). Of 710 occasional pts. (not sent by the family doctor or by the factory) with significant symptomatology, 1.1% had carcinoma of the portio. All cases of carcinoma were seen in pts. with suspected diagnoses after colposcopy; no carcinomas were seen in pts. with benign diagnoses. Highest incidence of carcinoma of the uterine portio was seen in pts. between the ages of 20 and 40 yr.; 1.2% up to 30 yr. old and 1.3% between 31-42 yr. old. The per cent incidence of carcinoma of the portio was 1.9% for pluripara, 1.6% in primipara, 1.8% in primigravida and 0.4% in nullipara. Unhygienic home conditions figured in the case histories of 73% of the pts. with carcinoma of the portio. Highest incidences were reported for pts. living in agricultural-industrial (38%) or industrial (31%) zones. Of 79 pts. with carcinoma of the portio, 21 (26%) had another member of the family with a carcinoma.

5-1578 LITHIASIS AND CANCER OF THE GALLBLADDER. (Fr.) Fagarasanu, I. (Dept. Surg., Carol Davila Hosp., Bucurest, Rumania) and D. Aloman. Lyon Chir. 60(5):656-666, 1964.

Described are 58 cases of carcinoma of the gallbladder, 79.5% of whom had a previous history of gallstones. On the basis of foreign statistics and personal experience the authors consider lithiasis a probable cause of cancer of the gallbladder.

5-1579 MALIGNANT RENAL NEOPLASMS IN SINGAPORE. (SURVEY OF INCIDENCE, MORTALITY, AND PATHOLOGICAL FEATURES.) (E.) Ali, M. Y. (Dept. Path., U. Singapore, Malaysia) and C. S. Muir. Brit. J. Urol. 36(4):463-481, 1964.

In Singapore during 1954-1961, the crude renal cancer General Hosp. admission rates (per 100,000/yr.) for 149 males (M) and females (F) of various races were: 119 Chinese, 1.5 and 1.3; 12 Malays, 1.1 and 0.4; 13 Indians or Pakistani, 1.6 and 0.7; 5 others, 1.4 and 2.3, resp. The

crude rate for all the races combined was 1.1 for F and 1.4 for M. The Singapore rates are about half of the published rates for the white population of the U.S. During 1957-59, there were 13 deaths (M and F) from renal cancer representing a crude mortality rate of 0.4. Primary renal cancer accounted for 0.07% of the 30,032 necropsies performed during 1950-62 and for 0.8% of the 8,547 cancers (all sites) diagnosed at biopsy between 1950 and 1961. The M:F ratio was 1.4:1 for all renal cancers, and the ratio for 76 pts. over 20 yr. of age was 1.8:1. Only 7 nephroblastomas occurred in M as compared to 15 in F which is a reversal of the usual pattern. There was no significant difference as regards racial distribution.

65-1580 HODGKIN'S DISEASE IN ROOMMATES. (E.) George, W. K. (U. Texas Med. Br., Galveston), M. Miller and W. D. George, Jr. J. Am. Coll. Health Assn. 13(3):399-402, 1965.

Two case histories are presented of 2 medical students with mediastinal Hodgkin's disease who had lived in the same room within a short time of each other and had shared a common environment.

65-1581 BASAL-CELL CARCINOMA. AN AETIOLOGICAL STUDY OF PATIENTS AGED 45 AND UNDER WITH SPECIAL REFERENCE TO GORLIN'S SYNDROME. (E.) Summerly, R. (Skin Dept., St. Thomas' Hosp., London). Brit. J. Derm. 77(1):9-15, 1965.

Of 125 pts. (age 45 or less) with basal cell carcinoma seen during 1953-1963 at St. Thomas' Hospital, 30% of the lesions were considered to be nevroid (37 pts.) and 40% (50 pts.) were the result of premature degenerative changes in the skin (39 pts.), previous radiotherapy (5), arsenical medication (5) and injury (1); the lesions in 30% (38 pts.) could not be classified. In the pts. with nevroid lesions, 7 had associated congenital anomalies, 1 pt. had Gorlin's syndrome and another possibly had an incomplete form. Familial predisposition was reported by 13/125 pts. and in 1/13 the basal cell carcinoma was present for 3 generations.

65-1582 FACTORS INFLUENCING THE PROGNOSIS OF BREAST CANCER. EXPERIENCE AT GROOTE SCHUUR HOSPITAL, CAPE TOWN. (E.) Helman, P. (Dept. Surg., U. Cape Town, S. Africa). S. Afr. J. Surg. 1(1):20-32, 1963.

Among 739 White, 376 Colored, and 29 Bantu female pts. (22-95 yr. old) treated for mammary cancer, the higher incidence of White pts. was due simply to longevity. There was a much lower incidence of non-Whites in the older age groups. Over 90% of the histologically investigated specimens were spheroidal celled carcinomas or adenocarcinomas, with their anaplastic and scirrhous varieties.

- 65-1583 INCIDENCES OF CARCINOMAS IN VARIOUS NATIONS. (Jap.) Momoki, M. (Dept. Public Health, Tohoku U. Sch. Med., Japan) and A. Takano and M. Ito. Shindan To Chiryō (Diag. Ther.) 53(1):165-167, 1965.

In a survey conducted during 1959-60, the incidence (per 100,000) of carcinoma of the stomach in Miyagi Prefecture was 93.5 for males and 46.8 for females; similar rates for all carcinomas were 187.9 and 149.8, resp. The incidence of all carcinomas in this survey did not differ greatly from that of 14 other nations surveyed, but the incidence of carcinoma of the stomach in this study was highest among all the nations.

- 65-1584 THE INFLUENCE OF OCCUPATIONAL EXPOSURE TO RADIATION ON THE MORTALITY OF AMERICAN RADIOLOGISTS AND OTHER MEDICAL SPECIALISTS. (E.) Seltser, R. (Dept. Epidemiol., Johns Hopkins U. Sch. Hygiene, Baltimore, Md.) and P. E. Sartwell. Am. J. Epidemiol. 81(1):2-22, 1965.

The approx. age-adjusted death rates (per 100,000) for cancer during 1945-54 for 3 American medical specialty societies (Radiological Society of North America (RSNA), American College of Physicians (ACP) and American Academy of Ophthalmology and Otolaryngology (AAOO)), were resp., for age 35-49--35, 50, and 75; for age 50-64--400, 200, and 200; age 65-79--1000, 800, and 700. When the deaths from major causes, leukemia and all other cancer in RSNA during 1935-1958 were determined and compared with the expected deaths based on the age- and time-specific mortality rates of the AAOO, leukemia showed the highest mortality ratio of 2.5 (ages 35-79) as compared to 1.6 for cancer, 1.2 for cardiovascular-renal disease and 1.6 for all other causes. The findings warrant the inference that occupational exposure to ionizing radiation has produced a non-specific life-shortening effect.

- 65-1585 VITAL STATISTICS OF THE UNITED STATES, 1963. VOL. 2--MORTALITY, PART A. Linder, F. E. (Director; Nat. Ctr. Health Statistics, Washington, D. C.). U.S. Dept. Health, Educat., Welfare. U.S. Govt. Print. Office, Washington, D. C., 1965, \$3.75.

A compilation of mortality rates for the year 1963, including data on malignant neoplasms, classified according to the site of the neoplasm; month of death, race, sex, age and place of residence (by state) of the pt. Similar mortality data are also given for infants up to one year of age.

- 65-1586 MALIGNANT LYMPHOMAS. A CLINICAL STUDY OF 800 INDIAN PATIENTS. (E) Desai, P. B. (Tata Mem. Hosp., Parel, Bombay, India), D. R. Meher-Homji and J. C. Paymaster. Cancer 18(1):25-33, 1965.

In the series of 800 lymphoma cases reviewed, number of cases in relation to age was: 11-20, 108; 21-30, 150; 31-40, 134; 41-50, 150; 51-60, 115; 63 cases occurred before age 11 and 80 cases after age 60. Male-female sex ratio was 4.5:1 while that for all cancer pts. in the hospital was 1.9:1.

- 65-1587 SMOKING HABITS AND LUNG CANCER IN ISRAEL. (Heb.) Rakower, J. (Pulm. U. Hadassah U. Hosp., Jerusalem, Israel). Harefu 67(4):115-119, 1965.

- 65-1588 ANALYSIS OF 64 CASES OF BRONCHIAL CARCINOMA. (Ser.) Kotur, B. (Dept. Pneumonol., Tubercul. Hosp., Novi Sad, Yugoslavia). V. Ilić and D. Latinčič. Med. Glas. 18(9):262-264, 1964.

- 65-1589 THE SWEDISH BONE TUMOR REGISTRY. (Sw.) Santesson, L. (Inst. Radiopath., D. Karolinska Hosp., Stockholm, Sweden) and A. Lindbom. Svensk. Lakartidn. 60:2966-2970, 1964.

- 65-1590 PROLONGED ACTION OF IONIZING RADIATION AMONG THE SURVIVORS OF THE ATOM BOMB DETONATION IN JAPAN. (Sw.) Nelson, A. (Radiobiol. Inst., Forsvarets Res. Inst., Sundbyberg, Sweden). Svensk. Lakartidn. 61(52):4080-4097, 1964.

- 65-1591 THE INCIDENCE RATE OF THE PRINCIPAL LOCALIZATIONS OF CANCER ACCORDING TO AGE GROUPS. (Rum.) Negru, I. (Inst. Oncol., Bucharest, Rumania). Oncol. Radiol. 3(3):271-276, 1964.

- 65-1592 THE ROLE OF SOME ETIOPATHOGENIC FACTORS IN THE APPEARANCE OF PRECANCEROUS CONDITIONS AND OF CANCER OF THE LOWER LIP. (Rum.) Tanev, C. (Inst. Oncol., Sofia, Bulgaria) and G. Bureac. Oncol. Radiol. 3(3):223-227, 1964.

- 65-1593 TREATMENT OF THE SKIN CARCINOMAS OF THE EYELIDS AND CANTHI (242 CASES). (Turk.) Budaras, A. (Dept. Radiotherap., U. Istanbul Sch. Med., Capa, Turkey). Tip Fak. Mec. (Istanbul) 27(2):14-29, 1964.

- 65-1594 FACTORS AFFECTING THE INCREASE OF LUNG CANCER MORTALITY IN FINLAND. (Fin.) Hakama, M. and E. Saxén. Duodecim 80(18):781-784, 1964.

- 65-1595 NATURAL HISTORY OF ADENOCARCINOMA OF THE UTERUS IN THE PHIPPS RABBIT COLONY. (E.) Ingalls, T. H. (Henry Phipps Inst.,

Pennsylvania Sch. Med., Philadelphia), W. M. J. Nat. Cancer Inst. 33(5):799-806, 1964.

5-1596 CHILDHOOD CANCER IN SHELBY COUNTY, TENN.; AN EPIDEMIOLOGICAL STUDY. (E., Abstract) Hernandez, K. (St. Jude Hosp., Memphis, Tenn.) and G. Tokuata. Proc. Am. Assn. Cancer Res. 6:27, 1965.

5-1597 RURAL LEUKEMIA AND LYMPHOMA. (E., Abstract) Rigby, P. G. (Eugene C. Spley Inst., U. Nebraska Coll. Med., Omaha),

R. C. Rosenlof and P. Pratt. Proc. Am. Assn. Cancer Res. 6:54, 1965.

65-1598 DISTRIBUTION OF OUR PATIENTS WITH CANCER OF THE STOMACH IN RELATION TO BLOOD GROUPS. (Hun.) Bárdosi, Z. (3rd Clin. Surg., Med. U. Budapest, Hungary), S. Dubecz and M. Adám. Magy. Onkol. 8(4):252-256, 1964.

65-1599 STATISTICAL DATA CONCERNING THE FREQUENCY OF CANCER IN THE DEPARTMENT OF IMATHIA DURING THE YEARS FROM 1950 TO 1959 INCLUSIVE. (Gr.) Tissarchondou, I. Galenus 10(10):732-763, 1964.

See also abstract nos.: 1309, 1310, 1321, 1332, 1335, 1336

MISCELLANEOUS

- 65-1600 ON CYSTS IN MICE OF THE LOW CANCER LINE C57BL. (E.) Zhdanov, V. M. (Dept. Leukemia Study, Acad. Med. Sci. USSR, Moscow) and V. A. Parnes. Bull. Exp. Biol. Med. (Eng.) 55(4):433-441, 1964.

Translation from the Russian of an article originally published in Biull. Eksp. Biol. Med. 55(4): 82-91, 1963. See CRA 1(4):#765, 1963.

- 65-1601 CYTOSPECTROPHOTOMETRIC STUDY ON DNA CONTENT IN THE CELLS OF HUMAN BRAIN TUMORS. (Rus.) Pevzner, L. Z. (A. L. Polenov Res. Inst. Neurosurg., Leningrad), E. D. Tomina and T. V. Chaika. Vop. Med. Khim. 10(4):379-386, 1964.

Ultraviolet cytospectrophotometry of 41 benign and malignant human brain tumors showed that all tumors had a higher DNA content than normal astrocytes. The malignant tumors, i.e., spongioblastomas multiforme and arachnoid endotheliomas, usually had a higher DNA content than less malignant tumors (astrocytomas, oligodendrogliomas).

- 65-1602 A COMPARATIVE STUDY OF THE ANTIGENIC STRUCTURE OF TUMOR TISSUE AND HOMOLOGOUS NORMAL TISSUE. REPORT 4. IMMUNOLOGICAL CHARACTERISTICS OF THE ANTIGEN-ANTIBODY COMPLEX. (E.) Lomakin, M. S. (Inst. Exp. Biol., Acad. Med. Sci. USSR, Moscow) and E. V. Sokolova. Bull. Exp. Biol. Med. (Eng.) 55(3):313-317, 1964.

Immunological studies (using the complement-fixation reaction) showed that normal serum, in which homologous precipitates were dissolved, reacted more intensely with homologous antigens and much less with the antigens from normal tissues and erythrocytes (E). On the other hand, normal sera in which heterologous precipitates were dissolved reacted more intensely with antigens from E and much less with antigens from normal and tumor tissue. These results show both antigenic similarities and differences between tissues of the ovarian carcinoma, ovary, kidney and E. In tissue culture, the antibodies from either a homologous or heterologous complex depress the culture growth of tumor tissue more than the growth of cultures of homologous normal tissue and have no significant depressing effect upon the growth of kidney tissue cultures of newborn animals.

- 65-1603 MULTIPLE CHROMOSOMAL ABERRATIONS IN A PATIENT WITH ACUTE GRANULOCYTIC LEUKEMIA ASSOCIATED WITH DOWN'S SYNDROME AND TWINNING. STUDY OF A FAMILY WITH A POSSIBLE TENDENCY TO NONDISJUNCTION. (E.) Kiossoglou, K. A. (Pratt Clin., New England Ctr. Hosp., Boston, Mass.), E. H. Rosenbaum, E. J. Mitus and W. Dameshek. Blood 24(2):134-159, 1964.

A detailed case history is presented of a 4-year old boy with mongolism (Down's syndrome, G21 trisomy) associated with acute granulocytic leukemia and family history of double heterokaryotic twinning with a pattern of 1 normal and 1 somatically affected child (the twin sister of propositus was normal). Detailed family chromosomal studies (8 family members) are presented. Multiple chromosomal aberrations were found in propositus (trisomies and polysomies involving predominantly the G, F, and D series). It was concluded that multiple mitotic nondisjunction anomalies might be of etiologic importance in the leukemic process. Other injurious factors possibly implicated in the development of trisomic syndromes and/or neoplasia included ionizing radiation, in utero X-irradiation, chemicals (the propositus swallowed a small amount of kerosene 3 wk. prior to admission), and advanced parental age (mother 41 and father 53 yr. at the time of pt.'s birth). A review of pertinent literature is included (100 references).

- 65-1604 MULTIPLE CHROMOSOME ABERRATIONS IN DOWN'S SYNDROME ASSOCIATED WITH TWINNING AND ACUTE GRANULOCYTIC LEUKAEMIA. (E.) Kiossoglou, K. A. (Pratt Clin., New England Ctr. Hosp., Boston, Mass.), E. Rosenbaum, W. J. Mitus and W. Dameshek. Lancet 2:944-945, 1963.

See CRA 3(6):#1603, 1965.

- 65-1605 DELETION OF THE CHOLESTEROL-NEGATIVE FEEDBACK SYSTEM IN LIVER TUMORS. (E.) Siperstein, M. D. (Dept. Int. Med., U. Texas Southwestern Med. Sch., Dallas) and V. M. Fagan. Cancer Res. 24(7):1108-1115, 1964.

While cholesterol synthesis was found to proceed at significant rates in mouse hepatoma BW 7756, Morris rat hepatoma 5123-t.c., and in a relatively well differentiated human hepatoma, it was determined that all 3 completely lacked the cholesterol-negative feedback control mechanism. The presence of a s.c. hepatoma had no influence on the normal feedback system in the liver of the tumor-bearing animal. Finally, since the regenerating livers of both the mouse and rat are capable of normal feedback response, it is suggested that the absence of this feedback system may be secondary to the tissue malignancy per se rather than to rapid cellular proliferation.

- 65-1606 CONTRIBUTION TO THE STUDY OF GASTRIC MALIGNANT LYMPHORETICULOSIS WITH PARTICULAR REGARD TO THE LESIONS WHICH MAY PRECEDE THEM. (It.) Fichera, G. (Inst. Path. Surg., U. Catania, Italy) and S. Romeo. Gior. Ital. Pat. 10(6):402-421, 1963.

The case is presented of a 47-year-old woman with a 10-year-history of dyspeptic disturbances whose radiologic examination showed signs of both an ulcerative and infiltrative process of the stomach. Surgery revealed a reticulum cell sarcoma. A review of the literature (60 references) indicated previous gastritis or ulcer (of many yr. duration in most cases) in 25% of the cases of malignant lymphoreticulososes of the stomach.

- 65-1607 ON THE ASSOCIATION OF CANCER AND PULMONARY TUBERCULOSIS. (ANATOMICAL AND CLINICAL OBSERVATIONS). (It.) Del Torre, L. (Clin. Tisiol., U. Parma, Italy). Gior. Pneumol. 7(5):487-504, 1963.

The association of bronchial carcinoma with tuberculosis in 4 cases is reported.

- 65-1608 ANAPLASTIC BRONCHIAL CARCINOMA ARISING AFTER RECENTLY CURED PULMONARY TUBERCULOSIS. (Fr.) Vidal, J., J. Fourcade and J.-C. Marty. Montpellier Med. 54(1):20-23, 1963.

A case is reported of a 57-year-old man who developed bronchial carcinoma 4 mo. after the total cicatrization of pulmonary tuberculosis lesions treated by antibiotics. The tumor metastasized rapidly and death supervened after 3 mo.

- 65-1609 DERMATOMYOSITIS AND CANCER. (Rum.) Ciobanu, V. (Inst. Int. Med., Rumanian Acad. Sci., Bucharest), A. Coltoiu, C. Georgescu and E. Popescu. Stud. Cercet. Med. Intern. 4(6):817-825, 1963.

Two cases are presented of pts. with dermatomyositis (DM) and cancer among a group of 11 with DM.

- 65-1610 ACUTE DERMATOMYOSITIS AND CANCER OF THE BREAST. (Por.) Poiars Baptista, A. (Dept. Derm., U. Coimbra Sch. Med., Portugal). Trab. Soc. Port. Derm. 21:129-131, 1963.

A case report.

- 65-1611 CONSIDERATIONS ON ALIMENTATION, CELLULAR GROWTH AND CANCER. (Por.) Meyer, J. R. Biologico (Sao Paulo) 29:212-214, 1963.

The author suggests a relationship between type of alimentation and the growth of cancer cells after presenting evidence of high cancer incidence in subjects who eat foods of high glucose content and low cancer incidence in subjects whose diet consists mainly of proteins.

- 65-1612 ASSOCIATION OF RHEUMATIC SYMPTOMS AND MALIGNANCY? (Fr.) Coste, F., F. Delbarre, J. Cayla, P. Massias and R. Weissenbach. Bull. Soc. Med. Hop. Paris 114(14):1179-1204, 1963.

The author reviews the literature (112 references) with regard to the incidence of rheumatic symptoms or paraproteinoses in the course of blood malignancies and presents data from his observations on the incidence of rheumatic symptoms and epithelial cancers. Of 7 pts. with various epithelial cancers (2 digestive tract, 2 unidentified, 2 prostate and 1 probable liver cancer), 4 or 5/7 were accompanied by pseudopolyarthritides, 1 or 2/7 by subacute arthritis and 1/7 by rheumatoid polyarthritides.

- 65-1613 THE CARCINO-LEUKEMIAS. (Fr., Ph.D. Thesis, U. Lyon, 1964, 185 pp.) Loire, R. Reviewed in Lyon Med. 212(41):747-749, 1964.

In a brief review of the conclusions reached by the author, the etiology and pathogenesis of the association is discussed. While in precancerous leukemia one has to deal with a true association (either coincidence due to chance or coexistence in a predisposed host), in the case of postcarcinomatous leukemia a factor of dependence or subordination appears to be involved.

- 65-1614 PRIMARY NEOPLASM OF THE NEOSTOMY AFTER SURGERY FOR GASTRODUODENAL ULCER. (It.) Giacomoni, M. A. (Inst. Spec. Path. Surg., U. Milan, Italy) and N. Bordone. Arch. Ital. Chir. 90(2):237-246, 1964.

Described are 3 cases (men, age 48-59 yr.) with cancer of the neostomy which developed 23-27 yr. after gastrectomy and 18 yr. after gastroenteroanastomosis for duodenal and gastric ulcer.

- 65-1615 CHROMOSOMAL ANALYSIS IN A FEW MALIGNANT TUMORS OF THE FEMALE GENITALIA. (It.) Gaffuri, S. (Dept. Obstet. Gynec., U. Turin, Italy) and S. Bertoli. Minerva Ginec. 16(15):607-612, 1964.

No specific and characteristic chromosomal alterations were observed in the cells of 4 uterine and 2 ovarian human carcinomas or adenocarcinomas grown in vitro after removal.

- 65-1616 HOST DEFENSE MECHANISMS AND HUMAN CANCER. (E.) Southam, C. M. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.). Ann. Inst. Pasteur 107(5):585-597, 1964.

Whether the malignancy of cancer results from an inadequacy of growth regulation or from complete biological anarchy was studied by various experimental methods. Autotransplantation studies have revealed that pts. with incurable cancer show some

type of resistance to cancer implant takes, and that this resistance is less in pts. with widespread disease than in those with less extensive disease. In studies on isoantibody response to cancer cell homografts in normal volunteers (see CRA 1(9-10):#1823, 1964), cancer-specific antigens common to many human cancers of diverse histologic types were found to exist. It is suggested that cancer is subject to repression by host defense mechanisms, and that the usual clinical picture of progressive cancer represents an inadequacy rather than a complete absence of defenses.

- 65-1617 CASE REPORTS. I. CARCINOMA OF THE BLADDER AND SCHISTOSOMIASIS HAEMATOBIIUM. (E.) Wolfe, M. S. (Natl. Inst. Health Med. Res., Ghana) and J. Edgcomb. Ghana Med. J. 3(2):81-84, 1964.

The presence of schistosomiasis and squamous carcinoma of the urinary bladder is reported in a 28-year-old African man who also had 5 other parasitic infestations: ankylostomiasis, strongyloidiasis, onchocerciasis, filariasis due to Wuchereria bancrofti and trichomoniasis. The relationship between bladder carcinoma and schistosomiasis is discussed briefly.

- 65-1618 A CASE OF BLADDER TUMOR IN A DYER. (It.) Finulli, M. Riv. Infort. Mal. Prof. 50:1202-1211, 1963.

The case is presented of a 57-year-old man, a dyer by profession for 37 yr., who developed a carcinoma of the urinary bladder. The possible oncogenic action of such benzene derivatives used in the dye industry such as aniline, auramine and fuchsin (magenta) hydrochlorate is discussed.

- 65-1619 CANCER OF THE GALLBLADDER. (Sp.) Soto Romy, E. J. (Inst. Clin. Surg., U. Buenos Aires Clin. Hosp., Argentina) and W. G. Lange. Rev. Argent. Cir. 6(1):9-10, 1963.

Among 63 pts. (51 female, av. age 58 yr.; 12 male, av. age 57 yr.) operated on for carcinoma of the gallbladder during a period of 43 yr. (1919-62), coexisting lithiasis of the gallbladder and common bile duct was observed in 36.5% and 6.3% of the pts., resp.

- 65-1620 ANGIOSARCOMA AFTER MASTECTOMY. STEWART-TREVES SYNDROME. (Sp.) Pataro, V. F. (Dept. Clin. Surg., Policlin., Avellaneda, Argentina) and M. W. Acrich. Prensa Med. Argent. 51(14):802-806, 1964.

A case is described of a 69-year-old woman with angiosarcoma of the right upper limb arising 26 yr. after a radical mastectomy on the same side for mammary carcinoma and 10 yr. after appearance of lymphedema on the same arm. A review (54

references) of the related literature is included.

- 65-1621 GENETIC SEX OF TUMORS OF THE BREAST AND UTERINE CERVIX. (Sp.) Montalvo Ruiz (2nd Dept. Obstet. Gynec., U. Madrid Sch. Med., Spain) and Montalvo Carrizosa. Acta Ginec. (Madrid) 14:97-104, 1963.

Sex chromosomes were studied in 16 pts. with breast tumors (13/16 malignant) and 40 pts. with cancer of the uterine cervix. Among the pts. with malignant breast tumors, 7/13 showed female (presence of Barr bodies) sex chromatin (5/7 scirrhous carcinoma, 1/7 solid carcinoma and 1/ adenocarcinoma) and 6/13 male sex chromatin (4/ scirrhous and 2/6 solid carcinoma). Pts. with cancer of the uterine cervix showed very low percentages of nuclei with Barr bodies: 6/40 with 0-4%; 16/40 with 5-9%; 18/40 with 10-20%.

- 65-1622 HERPES ZOSTER AND LEUKEMIA. (Sp.) Mas y Magro, F., Jr. (12 P. Calvo Sotelo, Alicante, Spain). Galicla Clin. 36(10) 703-708, 1964.

A case is described of a 60-year-old woman who developed herpes zoster and one yr. later developed chronic lymphocytic leukemia. This pt. had a 16-year history of lymphocytosis with high lymphocytolysis; among her relatives, a son and a nephew had died of Hodgkin's disease. The author believes that the hyperactive condition of the lymphoid tissue might have constituted a predisposing factor for the viral infection which in turn provoked the appearance of leukemia.

- 65-1623 EFFECT OF HOMOTRANSPLANTATION OF SKIN ON THE DEVELOPMENT OF A BROWN-PEARCE CARCINOMA IN RABBITS. (E.) Lomakin, M. S. (Inst. Exp. Biol., USSR Acad. Med. Sci., Moscow) and E. V. Sokolova. Bull. Exp. Biol. Med. (Eng.) 57(1):79-81, 1964.

This article is the English version of a Russian article appearing in Biull. Eksp. Biol. Med. 57(1):82-85, 1964. See CRA 2(3):#577, 1964.

- 65-1624 RNA SYNTHESIS IN KREBS II ASCITES TUMOUR CELLS. (E.) McNamara, P. (Chester Beatty Res. Inst., London, S.W.3). Life Sci. 3(12):1437-1447, 1964.

A rapid synthesis of RNA with high S value was demonstrated in Krebs II ascites tumor cells; this RNA was present only in the nuclei. The synthesis of ribosomal RNA increased with time. The rapidly labeled RNA may be the precursor of the ribosomal RNA, but this is not the case or just a simple breakdown of larger RNA molecules

into smaller ones. The data indicate also that the chromatin is the site of RNA synthesis and that the nucleolus contains highly labelled RNA.

65-1625 A NUCLEAR PROTRUSION IN A HUMAN TUMOR ASSOCIATED WITH AN ABNORMAL CHROMOSOME. (E.) Atkin, N. B. (Dept. Cancer Res., Mt. Vernon Hosp., Middlesex, England) and M. C. Baker. Acta Cytol. (Phila.) 8(6):431-433, 1964.

An abnormally long, sub-acrocentric chromosome, appearing as a protruding nuclear "bleb" at interphase and extending rod-like at metaphase, was found in 22% of tumor cells from malignant ascites of a pt. previously treated for ovarian carcinoma with chlorambucil and with radio-yttrium.

65-1626 STUDIES OF THE PHYTOHEMAGGLUTININ-STIMULATED CHANGE OF HUMAN BLOOD LYMPHOCYTES INTO BLAST-LIKE CELLS. (Ger.) Gropp, A. (Inst. Path., U. Bonn, Germany) and R. Fischer. Virchow Arch. Path. Anat. 338(1): 54-77, 1964.

In vitro cultivation of human white cells in the presence of phytohemagglutinin (from Phaseolus vulgaris), resulted in large "blast-like" cells, which developed from small lymphocytes and which divided mitotically. Their main characteristics were: a pronounced basophilic cytoplasm with coarse sudanophilic granules, a nucleus of loose structure, very large nucleoli, a distinct ATPase activity at the edge of the cell, and, in some cells, strongly positive acid phosphatase reaction. Cultivation experiments showed that the blood lymphocyte is not an end-stage without developmental potentialities, but rather a cell form with marked transformation ability.

65-1627 ON THE QUESTION OF THE IMMUNOLOGY OF TUMORS. (A MODEL.) (Ger.) Karrer, K. (Austrian Cancer Res. Inst., Vienna) and P. Speiser. Wien. Klin. Wschr. 76(48):843-844, 1964.

The F₂ generation of random-bred mice which were inoc. (s.c. or i.p.) with Ehrlich ascites cells (EAC) 3 or 1 wk. before tumor cell transplantation showed a significantly longer survival time if the EAC cells were first incub. in the serum of mice bearing s.c. tumors than if the cells were untreated or were incub. in saline or in the serum of non-tumor bearing mice. The protective effect noted showed a certain amount of sex dependency.

65-1628 GENETICS AND SKIN TUMORS, WITH SPECIAL REFERENCE TO BASAL CELL NEVI. (E.) Anderson, D. E. (Dept. Biol., U. Texas M. D. Anderson Hosp., Houston), J. L. McClendon and J. B. Howell. Pp. 91-127 in TUMORS OF THE SKIN. Cumley, R. W., J. McCay, D. Aldridge, S. Connelly,

J. Haroz, A. Reiner and W. White (Eds.). Year Book Med. Publ., Inc., Chicago, 1964, 322 pp.

Genetic studies were conducted in the families of 7 pts. reported to have multiple basal cell carcinoma and/or jaw cysts. Cutaneous, histopathologic and X-ray examinations of 36 relatives of the 7 original pts. revealed the following: basal cell nevi (42%), jaw cysts (44%), bifid (14%), and deformed (14%) ribs, spina bifida occulta (19%) and scoliosis or kyphosis (14%). The rib and spinal anomalies were associated with basal cell nevi and/or jaw cysts. The frequency and distribution of the syndrome in the kindred closely followed a dominant hereditary pattern indicating a genetic basis. The syndrome was equally frequent in males and females, in children from affected male parents or affected female parents, and in children born early or late.

65-1629 STUDIES ON THE MECHANISM OF CARCINOGENESIS. (FUSION AND LIFE-CYCLES OF MAMMALIAN CELLS). (E.) Gross, K. (Inst. Oncol., Prague, Czech.). Oncologia (Basel) 18(3):178-194, 1964.

After reviewing previous work on the fusion of human somatic cells as observed in tumorous and non-tumorous tissue cultures (see CRA 3(4):#928, 1965), the author studies the problem of cell multiplication in various tissues. Tissue cultures obtained from various tissues (organs of a 3-month-old fetus, cells from cancerous exudates of the peritoneum and pleura, cells from ELD and L-929 cell strains) have revealed that mammalian cells of tissues at different stages of development have different life cycles. A modification of environmental conditions may induce a marked change in the life cycles of cells or even an alternation of asexually and sexually produced generations. This alternation of the life cycle of cells could be one of the basic causes of cancer.

65-1630 CARCINOGENESIS IN STOMACH CANCER. (Jap., Abstract) Ito, K. (Dept. Path., Mie Prefect. U. Sch. Med., Japan). Mie Igaku (J. Mie Med. Assn.) 8(1):70, 1964.

As pathological changes contributing to the genesis of carcinoma of the stomach the author lists chronic gastric ulcer, scar tissue formation from gastric ulcer, gastritis, and papilloma. The changes noted included atrophy and decrease of normal glandular structure, metaplasia of the intestinal epithelium, cyst formation, proliferation of the pyloric glands and Brunner's duct-like structure, metaplasia of other tissues such as squamous epithelium, tissue anomaly and infiltration of inflammatory cells and others.

65-1631 LEAF-LIKE TUMOR OF THE MAMMARY GLAND. (Rus.) Fiks, A. F. Sovet. Med. 27(1): 76-81, 1964.

A report on 40 pts. with a "leaf-like" tumor ("tumor phyllodes"). The author supports the view that this tumor is a precancerous sarcoma of the mammary gland.

65-1632 CONTRIBUTION TO THE STUDY OF MULTIPLE TUMORS. (It.) Bortolozzi, G. (Inst. Path. Anat., Civil Hosp. Treviso, Italy). Gior. Med. Marca Trevig. 21(Ser. 2):239-272, 1963.

The case is presented of a 61-year-old woman with multiple malignancies localized in the gallbladder, duodenum, transverse colon and common bile duct.

65-1633 CARCINOMA OF MALE BREAST IN ASSOCIATION WITH THE KLINEFELTER SYNDROME. (E.) Jackson, A. W. (Christie Hosp., Manchester, England), S. Muldal, C. H. Ockey and P. J. O'Connor. Brit. Med. J. 1:223-225, 1965.

A presentation of 3 cases.

65-1634 A CASE OF THE ASSOCIATION OF TUBERCULOSIS AND MALIGNANT LYMPHOGANULOMA OF THE LUNG. (It.) Rocco, V. (Dept. Tisiol., U. Naples, Italy), E. Micillo and G. Vasaturo. Arch. Tisiol. 19(2):156-176, 1964.

65-1635 SQUAMOUS-CELL CARCINOMA ARISING IN A DENTIGEROUS CYST. REPORT OF A CASE. (E.) Kramer, H. S. (U.S. Naval Hosp., Chelsea, Mass.) and J. H. Scribner. Oral Surg. 19(4):555-561, 1965.

65-1636 ADENOAMELOBLASTOMA IN THE WALL OF A DENTIGEROUS CYST. REPORT OF A CASE. (E.) Hornová, J. (2nd Stomat. Clin., Brno, Czech.). Oral Surg. 19(4):508-514, 1965.

65-1637 EOSINOPHILIC LEUKEMIA AND DISSEMINATED EOSINOPHILIC COLLAGEN DISEASE--A DISEASE ENTITY? (E.) Odeberg, B. (2nd Dept. Med., U. Gothenburg, Sweden). Acta Med. Scand. 177(2):129-144, 1965.

Two case reports.

65-1638 HEPATIC CLONORCHIASIS AND CARCINOMA OF THE BILE DUCT IN A DOG. (E.) Hou, P. C. (Chinese Med. Coll., Peking, China). J. Path. Bact. 89(1):365-367, 1965.

A case report.

65-1639 OSTEOGENIC SARCOMA OF THE ILLIUM. REPORT OF A CASE ASSOCIATED WITH OSTEOBLASTIC PROSTATIC ADENOCARCINOMA. (E.)

Muggia, F. M. (Dept. Med., Hartford Hosp., Conn.) and R. Tennant. J. Bone Joint Surg. (Am.) 47(2):500-510, 1965.

65-1640 A CASE OF SQUAMOUS CELL CARCINOMA ARISING FROM CONDYLOMATOUS TUBERCULOUS LESION OF THE SKIN. (Jap.) Ono, F. (Dept. Derm. Hiroshima U. Sch. Med., Japan), T. Ishibe and I. Takenaka. Hifuka No Rinsho (Clin. Derm. (Tokyo)) 7(2):137-140, 1965.

65-1641 MALIGNANCY IN A GASTRIC POLYP. (E.) Goldmann, M. A. and W. E. Fishman. Bull. Weiss Mem. Hosp. 6(1):52-58, 1964.

A case is reported of a 68-year-old male with a gastric polyp that showed histologic properties of adenocarcinoma.

65-1642 CARCINOMA ARISING FROM A BURN SCAR TISSUE. (Jap., Abstract) Yoshida, Y. (Tohoku U. Sch. Med., Japan). Nippon Hifuka Gakkai Zasshi (Jap. J. Derm., Ser. A) 74(11):724-725, 1964.

65-1643 CARCINOMA ARISING FROM A BURN SCAR TISSUE. (Jap., Abstract) Sugawara, M. (Hirosaki U. Sch. Med., Japan). Nippon Hifuka Gakkai Zasshi (Jap. J. Derm., Ser. A) 74(11):726, 1964.

65-1644 BRONCHIAL CARCINOMA IN AN OVARIAN CYSTIC TERATOMA (DERMOID). (E.) Fox, H. (Dept. Path., U. Manchester, England). J. Clin. Path. 18(2):164-166, 1965.

A case report.

65-1645 GIANT CONDYLOMA ACUMINATA: INCIDENCE AMONG CASES DIAGNOSED AS CARCINOMA OF THE PENIS. (E.) Davies, S. W. (Dept. Path., U. Liverpool, England). J. Clin. Path. 18(2):142-149, 1965.

65-1646 GENETIC CONTROL OF EXPERIMENTAL TERATOGENESIS IN MICE. (E., Abstract) Stevens, L. C. (Jackson Lab., Bar Harbor, Me.). Anat. Rec. 151(3):420-421, 1965.

65-1647 RETICULUM-CELL SARCOMA AND RHEUMATOID ARTHRITIS IN A PATIENT WITH XY/XXY/XX KLINEFELTER'S SYNDROME AND NORMAL INTELLIGENCE. (E.) MacSween, R. N. M. (Dept. Path., Western Infirm., U. Glasgow, Scotland). Lancet 1:460-4, 1965.

A case report.

65-1648 ON THE QUESTION OF THE DEVELOPMENT OF CARCINOMA AS A SEQUELA OF LICHEN RUBER PLANUS OF THE ORAL MUCOUS MEMBRANE. (Ger.) Kobberg, W. (Jaw-Face Clin. Surg., Med. Acad., Dusseldorf, Germany), D. Schettler and G. Selle. Munchen. Med. Wschr. 107(10):463-466, 1965.

Three case reports and review of 48 cases found in the literature (38 references).

65-1649 MACROGLOBULINEMIA IN ASSOCIATION WITH KAPOSI'S SARCOMA. (E.) Cohen, F. B., M. Kannerstein and E. Klosk. J. Newark Beth Israel Hosp. 16(1):30-49, 1965.

A case report.

65-1650 PNEUMATOSIS CYSTOIDES INTESTINALIS ASSOCIATED WITH ABDOMINAL CARCINOMA-TOSIS. (E.) Thorpe, G. J. (St. James' Hosp., Balham, London). Postgrad. Med. J. 41(471):41-42, 1965.

65-1651 KARYOTYPES OF 18 HUMAN SOLID TUMORS. (E., Abstract) Yamada, K. (Roswell Park Mem. Inst., Buffalo, N. Y.) and A. A. Sandberg. Proc. Am. Assn. Cancer Res. 6:69, 1965.

65-1652 AGING AND CANCERIGENESIS. I. IMMUNITY TO TUMOR AND SKIN GRAFTS. (E.) Teller, M. N. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.), G. Stohr, W. Curlett, M. L. Kubisek and D. Curtis. J. Nat. Cancer Inst. 33(4):649-656, 1964.

65-1653 AGING AND CANCERIGENESIS. II. EFFECT OF AGE ON PHAGOCYTIC ACTIVITY OF THE RETICULOENDOTHELIAL SYSTEM AND ON TUMOR GROWTH. (E.) Aoki, T. (Dept. Exp. Chemother., Cornell U. Grad. Sch. Med. Sci., New York, N. Y.), M. N. Teller and M. L. Robitaille. J. Nat. Cancer Inst. 34(2):255-264, 1965.

Experimental study in Swiss mice; tumor involved was Ehrlich ascites tumor.

65-1654 CHROMOSOMES OF SOME HETEROTRANSPLANTED HUMAN TUMORS. I. H. EMB. RH. #1, H. S. #1 and ME 1. (E.) Miles, C. P. (Mem. Sloan-Kettering Cancer Ctr., New York, N. Y.). J. Nat. Cancer Inst. 34(1):103-115, 1965.

65-1655 ISOANTIGENIC PROPERTIES OF TUMORS TRANSGRESSING HISTOCOMPATIBILITY BARRIERS OF THE H-2 SYSTEM. (E.) Möller, E. (Dept. Tumor Biol., Karolinska Inst. Sch. Med., Stockholm, Sweden). J. Nat. Cancer Inst. 33(6):979-989, 1964.

65-1656 MALIGNANCY EVALUATION OF IN VITRO TRANSFORMATION OF MOUSE CELL LINES IN CHICK MESONEPHROS ORGAN CULTURES. (E.) Barski, G. (Gustave Roussy Inst., Villejuif/Seine, France) and E. Wolff. J. Nat. Cancer Inst. 34(4):495-510, 1965.

65-1657 CHROMOSOME PATTERNS IN THE AKR MOUSE: SPONTANEOUS LEUKEMIA, ASCITES TRANSFERS, AND TISSUE CULTURE CELL LINES. (E.) Cailleau, R. (Cancer Res. Inst., U. California Med. Ctr., San Francisco) and M. M. Munro. J. Nat. Cancer Inst. 33(5):813-824, 1964.

65-1658 STUDIES OF THIRTY DIFFERENT BENICE JONES PROTEIN-PRODUCING PLASMA CELL NEOPLASMS IN AN INBRED STRAIN OF MOUSE. (E.) McIntire, K. R. (NCI, Bethesda) and M. Potter. J. Nat. Cancer Inst. 33(4):631-648, 1964.

65-1659 CHROMOSOME STUDIES OF A CONTAGIOUS RETICULUM CELL SARCOMA OF THE SYRIAN HAMSTER. (E.) Cooper, H. L. (Nat. Inst. Dent. Res., Bethesda), C. M. MacKay and W. G. Banfield. J. Nat. Cancer Inst. 33(4):691-706, 1964.

65-1660 SEBORRHEIC VERRUCA AND INTRAEPIDERMAL BASAL CELL EPITHELIOMA OF JADASSOHN. (E.) Morales, A. (2799 W. Grand Blvd., Detroit, Mich.) and F. Hu. Arch. Derm. (Chicago) 91(4):342-344, 1965.

A case report.

65-1661 INTRA-HEPATIC CYSTADENOMA OF BILE DUCT ORIGIN, WITH MALIGNANT ALTERATION. REPORT OF A CASE, TREATED WITH TOTAL LEFT HEPATIC LOBECTOMY. (E.) Thompson, J. E. (Dept. Surg., Roosevelt Hosp., New York, N. Y.) and M. Wolff. Milit. Med. 130(3):218-224, 1965.

65-1662 OCCURRENCE OF MAMMARY TUMORS, RETICULAR NEOPLASMS, AND PULMONARY TUMORS IN STRAIN BALB/cAnDe BREEDING FEMALES. (E., Abstract) Deringer, M. K. (NCI, Bethesda). Proc. Am. Assn. Cancer Res. 6:15, 1965.

65-1663 A CASE OF LYMPHANGIOMA MIXED WITH MYXOMA. (Jap.) Hashimoto, T. (Katta Hosp., Shiroichi City, Japan), K. Nobuta, T. Ando, K. Zeniya, T. Mori and E. Tsutsumi. Rinsho Shoni Igaku (J. Clin. Ped.) 13(1):6-9, 1965.

65-1664 CARCINOMA OF THE LUNG OCCURRING IN PATIENT WITH CAROTID BODY TUMOR: CASE REPORT. (E.) Moorhead, E. L. (Dept. Oncol., Henry Ford Hosp., Detroit, Mich.), R. D. White, R. W. Talley and R. V. Loo. Henry Ford Hosp. Med. Bull. 13(1):79-85, 1965.

65-1665 OBSERVATIONS ON SEX CHROMATIN IN MALIGNANT TUMORS. (E.) Talvalkar, G. V. (Dept. Path., Tata Mem. Hosp., Bombay, India). J. Postgrad. Med. 11(1):24-29, 1965.

65-1666 ADENOCARCINOMA ARISING IN AN ADENOMYOMA. (E.) Hawkins, D. F. Proc. Roy. Soc. Med. 58(4):237-238, 1965.

65-1667 TWO CASES OF BILATERAL MULTIPLE VIII NERVE TUMORS. (E.) Carruthers, D. G. (135 Macquarie St., Sydney, Australia). Ann. Otol. 74(1):241-251, 1965.

65-1668 COMBINED OCCURRENCE OF RETICULOSARCOMA AND ADENOMA OF THE SALIVARY GLANDS. (Hun.) Fodor, F. and M. Krutsay. Fulorrrgegygyaszat 10(3):138-141, 1964.

65-1669 SCLERODERMA AND LUNG MALIGNANCY. (Heb.) Ben Basat, M. (Dept. Path., Beilinson Hosp., Petah-Tikvah, Israel) and T. Rosenberg. Harefuah 67(4):122-124, 1965.

65-1670 AN ASHKENAZI FAMILY WITH GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY AND NEUROFIBROMATOSIS. (Heb.) Chemke, J. (Dept. B Pediat., Kaplan Hosp., Rehovoth, Israel) and S. Levin. Dapim Refuim 22(4):425-431, 14, 1963.

65-1671 A COMBINATION OF HIATUS HERNIA AND CANCER OF THE SUPERIOR REGION OF THE STOMACH. (Rus.) Antonovich, V. B. Vestn. Rentgen. Radiol. 40(1):24-30, 1965.

65-1672 CANCER AND CUSHING'S SYNDROME. (Dan.) Jensen, M. K. (Dept. A-B Med., Rigs Hosp., Copenhagen, Denmark), I. Transbøl and K. H. Olesen. Nord. Med. 73(9):197-202, 1965.

65-1673 TOBACCO SMOKING AND LUNG DISEASES. (Nor.) Lundar, J. (H. Heyerdahls St. Oslo, Norway). T. Norsk. Laegeforen. 85(5):437-442, 1965.

65-1674 LEUKOPLAKIA OF THE ORAL CAVITY AS A PRECANCEROUS LESION. (Gr.) Bandis, Galenus 8(8):619-624, 1964.

65-1675 IN VITRO STUDIES ON THE INVESTIGATION OF THE MYELOPOIESIS-REGULATING SUBSTANCES. (Hun.) Gidáli, J. (Frederic Joliot-Curie Radiobiol. Cent. Res. Inst., Budapest) and I. Fehér. Kiserl. Orvostud. 16(5):455-460, 1964.

65-1676 LYMPH NODES, PHTYSIS, CARCINOMA OF THE LUNG. (Hun.) Schwartz, P. (Warren State Hosp., Pa.). Tuberkulozis 11(1):321-333, 1964.

65-1677 OSTEOARTHROPATHY IN PATIENTS WITH CARCINOMA OF THE LUNG. (Hun.) Kulka, F. Tuberkulozis 6(1):176-178, 1964.

65-1678 CONTRIBUTION ON THE QUESTION OF A CONNECTION BETWEEN SMOKING AND CANCER OF THE RESPIRATORY TRACT. (Hun.) Gerencsér, F. Fulorrrgegygyaszat 10(2):78-83, 1964.

65-1679 NEVI, HAIRY NEVI, NEUROCUTANEOUS MELANOCYTOSIS. (Ger.) Herzberg, J. J. (Dept. Derm., State Hosp., Bremen, Germany). Zschr. K. Chir. 2(2):187-201, 1965.

65-1680 RETROGRESSION IN TESTICULAR SEMINOMA WITH VIABLE METASTASES. (E.) Azzopardo, J. G. (Dept. Morbid Anat., London Postgrad. Sch. Med.) and A. V. Hoffbrand. J. Clin. Path. 18(2):135-141, 1965.

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CARCINOGENESIS ABSTRACTS

National Cancer Institute

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

The National Cancer Institute, in response to Congressional interest and desire for a national program of cooperative research in cancer, is establishing a means whereby information in the field of carcinogenesis will be coordinated and made available. The information to be included will be obtained from the National Cancer Institute, other governmental agencies, and non-governmental research institutions.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by Index Medicus. If the journal is not covered by Index Medicus, then the abbreviations (with some modifications) found in World Medical Periodicals, 3rd Edition, are used.

ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	cytopathic effect	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic acid	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	Ic.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	In.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

65-1681 RETROSPECTIVE VIEWS CONCERNING LUNG
CANCER. (Sw.) Perret, L. Finsk.
Karesallsk. Handl. 108(1):94-100, 1964.

A general review, the author points out that the autopsy incidence of all forms of cancer in Finland was 7.5%, 26.8% and 10.2% in data derived from pathological institutes in Helsingfors during the years 1858-88 and 1948-57, and in data derived from the Finnish Central Bureau of Statistics in 1962, resp. Percentage incidence of monary cancers relative to all cancer seen at autopsy was 3.5, 15.8 and 17.7, resp. The increased relative incidence of pulmonary cancers attributed to both improved diagnostic methods and a probable increase in its absolute frequency of occurrence. (8 references)

65-1682 CIGARETTE SMOKING AND LUNG CANCER.
(Sw.) Diamant, M. Svensk. Lakartidn.
143(3):3227-3233, 1964.

A review of efforts to reduce the tar and nicotine content of cigarette smoke is supplemented by a report of effects achieved when cigarettes were smoked through an apparatus called "Ventar" which provides more air for the burning area. "Ventar" reduced tar-production by as much as 48%; when combined with filters, by 66%. In experimental animals exposed to the same conc. of cigarette smoke, 24-hour mortalities for untreated cigarettes were 100%; for "Ventar" cigarettes, zero. The tar reduction and reduction of nicotine content, which accompanied it, were attributed to a significant reduction in the heat of both cigarette and the smoke. (No references)

65-1683 CANCER RESEARCH 1964: THOUGHTS ON THE
CONTRIBUTIONS OF RADIATION BIOLOGY.
(Upton, A. C. (Biol. Div., Oak Ridge Nat. Lab., Tenn.). Cancer Res. 24(11):1861-1868, 1964.

The carcinogenic effect of radiation in man and animals is reviewed. (See also CRA 2(1):#12; and 2(1):#1248, 1964.) (80 references)

65-1684 A GENERAL STUDY OF THE GEOGRAPHIC
DISTRIBUTION OF LEUKEMIA. (Fr.)
Bernard, J. (Inst. Leukemia Res., Saint-Louis Hospital, Paris). Path. Microbiol. (Basel) 27(5): 722, 1964.

A general survey of epidemiological studies from the literature, the author concludes that the incidence of leukemia varies in different countries and within the same country, but the reasons for this geographic variation in leukemia mortality have not as yet been determined. The background of future studies is discussed. (No references)

65-1685 THE NEW TEST FOR CARCINOGENICITY AND
ITS USE IN CONNECTION WITH PRODUCTS
DERIVED BY HEATING FATS. (Nor.) Arffmann, E.
Andelsbogtrykkeriet (Publ.), Odense, 94 pp. Reviewed in Ugeskr. Laeg. 126(44):1474-1475, 1964.

Six previously published articles on this subject have now been assembled in the form of a monograph. (See CRA 1(8):#1519, 1963; ibid., 2(2):#257, 1964; and ibid., 3(3):#482, 1965.) (No references)

65-1686 EPITHELIAL AND FIBROEPITHELIAL TUMORS.
(E.) Pinkus, H. (Dept. Derm., Wayne State U. Sch. Med., Detroit, Mich.). Arch. Derm. (Chicago) 91(1):24-37, 1965.

A review and discussion is presented on the embryologic origins and development and morphology of various fibroepithelial (verrucous nevus, virus warts, acanthotic and basaloid, seborrheic verruca) and epithelial (keratosis senilis, Bowen's disease, squamous cell carcinoma) tumors of the skin. (46 references)

65-1687 EPITHELIAL AND FIBROEPITHELIAL TUMORS.
(E.) Pinkus, H. (Dept. Derm., Wayne State U. Sch. Med., Detroit, Mich.). Bull. N. Y. Acad. Med. 41(2):176-189, 1965.

See the preceding abstract. (23 references)

65-1688 MAMMARY TUMOR VIRUS IN MICE. (E.)
Moore, D. H. (Rockefeller Inst., New York, N. Y.). Science 147:1158-1160, 1965.

Reports are given of the work of various authors (about 18) which were presented at the informal working conference on the mouse mammary tumor virus held at Inverness, California, in October of 1964. D. H. Moore presented some of his material previously abstracted as CRA 1(3):#346, 1963; ibid., (11):#1971 and ibid., 2(6):#1119, 1964. Among other topics discussed were several methods of isolating and studying particles associated with the mammary tumor agent, chemical studies on viral particles isolated from the milk of RIII mice, the attempts to use tissue cultures in viral assays and for virus production, the failure of viral particles from C3Hf milk or tumor extracts to show infectivity, the transference of nodule-inducing virus by tissue transplantation, the milk-transmitted virus activity in the blood and mammary tissues of C3H and BALB/C mice fostered on milk from C3H mice, inhibition of the mammary tumor virus by leukemia virus in RIII mice. (No references)

65-1689 CARCINOGENIC INTERACTIONS BETWEEN VIRUS,
CELL, AND ORGANISM. (E.) Rubin, H.

(Virus Lab., U. California, Berkeley). J.A.M.A. 190(8):727-731, 1964.

Reviewed are the author's work and others on various aspects of the Rous sarcoma virus (RSV) such as its defectiveness, the functions performed by RSV alone, functions performed by the helper virus, the Schmidt-Ruppin strain of RSV and the properties of RSV. Cellular transformation and the avian leukosis viruses were also discussed. (See also CRA 1(1):#14, *ibid.*, (2):#262; *ibid.*, (3):#506, 1963; *ibid.*, 2(1):#85, *ibid.*, (2):#282 and #283, 1964; and *ibid.*, 3(6):#1504, 1965 and the following abstract.) (21 references)

65-1690 A DEFECTIVE CANCER VIRUS. (E.)
Rubin, H. Sci. Am. 210(6):46-52, 138, 1964.

Reviewed are the author's work and others on various aspects of the Rous sarcoma virus. (See also CRA 1(1):#14; *ibid.*, (2):#262 and *ibid.*, (3):#506, 1963; *ibid.*, 1(12):#2059, 1964; *ibid.*, 2(1):#85; *ibid.*, (2):#282 and #283, 1964; *ibid.*, 3(6):#1504; and *ibid.*, (7):#1932, 1965 and the preceding abstract.) (3 references)

65-1691 TRANSFORMATION OF CELLS IN VITRO BY DNA-CONTAINING VIRUSES. (E.)
Dulbecco, R. (P.O. Box 9499, San Diego, Cal.). J.A.M.A. 190(8):721-726, 1964.

Reviewed are the author's work and that of others on the effect of polyoma virus on mouse cell and hamster-embryo cell cultures, the virus-cell relationship in transformed cells and the mechanisms of transformation. (See also CRA 1(1):#13 and #110; *ibid.*, (8):#1553, 1963; *ibid.*, 1(11):#1848, 1964 and the following abstract.) (33 references)

65-1692 CONFIGURATIONAL AND BIOLOGICAL PROPERTIES OF POLYOMA VIRUS DNA. (E.)
Dulbecco, R. (Salk Inst. Biol. Studies, San Diego, Cal.). Proc. Roy. Soc. (Biol.) 160:423-431, 1964.

A review and discussion is presented on the open and closed molecular forms of DNA, the nature of the linker, configurational similarities and differences of DNA among carcinogenic and non-carcinogenic viruses, transformation of cells versus cytotoxic action by virus DNA's, various components in the viral DNA, characteristics of transformed cells and mutations. (28 references)

65-1693 ANTIANDROGENS. (E.) Dorfman, R. I. (Worcester Found. Exp. Biol., Shrewsbury, Mass.). Nat. Cancer Inst. Monogr. 12:161-180, 1963.

A review is presented on various methods for

determining antiandrogen activity. In one of the methods, methylcholanthrene or benzpyrene is used to inhibit the action of the androgen on the chick comb, and the previously reported results of this assay are given. (20 references)

65-1694 EXPERIMENTAL PROSTATIC CANCER: BACKGROUND OF THE PROBLEM. (E.)
Brendler, H. (Dept. Urol., New York U. Med. Ctr., N. Y.). Nat. Cancer Inst. Monogr. 12:343-349, 1963.

A brief review is presented of a number of methods used to induce prostatic cancer in animals. When whole mouse prostate glands were cultured with 20-methylcholanthrene (MC), an increase in cell divisions, foci of anaplastic cells with abnormal mitoses, hyperplasia and squamous metaplasia of the alveolar epithelium occurred. Transplantable squamous cancers which do not metastasize occurred after inj. of MC (in lard) into the anterior and dorsal prostatic lobes of inbred mice. Tumors occurred in white rats after prostatic inj. of 1,2-benzpyrene. (30 references)

65-1695 SOME PRINCIPLES ON THE PREVENTION OF CANCER DUE TO CHEMICAL SUBSTANCES. (Fr.) Shabad, L. M. (Inst. Exp. Oncol., USSR Acad. Med. Sci., Moscow). Med. Hyg. (Geneve) 22(665):1063-1065, 1964.

In an extensive review, the author discusses 2 ways in which malignant tumors can be prevented: (1) by suppressing the action of carcinogens on the organism and (2) by early detection and treatment of precancerous lesions. The hazards of carcinogenic chemical substances in various industries, in polluted air, in food additives, in cosmetics and in medical practice are discussed. It is suggested that safe dosage levels be determined for various chemical carcinogens and that their additive effects in combination be studied. (See also CRA 1(2):#194, *ibid.*, (3):#357, 1963 and the following abstract.) (No references)

65-1696 BLASTOGENIC SUBSTANCES IN HUMAN ENVIRONMENT AND PRINCIPLES OF PREVENTION. (E.) Shabad, L. M. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Acta Un. Int. Cancr. 19:458-460, 1963.

The author reviews and discusses the various carcinogenic substances in the human environment which have been shown experimentally to produce cancer and presents the main principles of cancer prevention. (See also CRA 1(1):#10; *ibid.*, (2):#172 and #194, 1963 and the preceding abstract.) (19 references)

65-1697 THE PROBLEM OF EXOGENOUS CARCINOGENESIS. (Cz.) Rosival, L. (Dept. Hygiene,

Comenius U., Bratislava, Czech.). Cesk. Hyg. 8:313-319, 1963.

More than 300 chemical carcinogens are known as occupational hazards. They include those found in soot, tars, and oils (which induce carcinomas upon contact with skin); benzidine and β -naphthylamine (which cause carcinoma of urinary bladder); chromium, asbestos, and nickel (inducing lung carcinoma); ionizing radiation (e.g., pulmonary carcinoma due to radon radioactivity, osseous malignant tumors in workers with phosphorescent dyes, leukemia in workers exposed to X-ray radiation). Initiators, promoters, and non-specific cocarcinogens are mentioned in general. Exposure to, and cumulative effects of, exogenous carcinogens under various living conditions are also discussed and reviewed (smoking and pollution of air, water, food, and drugs). (See also the following abstract.) (32 references)

65-1698 CARCINOGENIC EFFECTS OF ARSENIC. (Cz.) Rosival, L. (Dept. Hygiene, Comenius U., Bratislava, Czech.). Cesk. Hyg. 8:357-358, 1963.

A review of carcinogenesis following occupational and general environmental exposure to arsenic is presented. (See also the preceding abstract.) (8 references)

65-1699 THE ETIOLOGY OF LEUKEMIA. (E.) Gross, L. (VA Hosp., Bronx, N. Y.). Bull. Pol. Med. Sci. Hist. 8(1):16-17, 23, 1965.

A short review including material abstracted as CRA 1(1):#100; and *ibid.*, (4):#721, 1963; *ibid.*, (9-10):#1645, 1964; *ibid.*, 3(4):#809 and #817, 1965, and the following abstract.) (17 references)

65-1700 VIRAL ETIOLOGY OF LEUKEMIA AND LYMPHOMAS. (E.) Gross, L. (VA Hosp., Bronx, N. Y.). Blood 25(3):377-381, 1965.

Direct experimental evidence that leukemias and lymphomas occurring in various animal species are caused by viruses is reviewed; no such evidence is as yet available for humans. Transmission, species limitations of leukemic viruses, and their sensitivity to heat (e.g., inactivation by milk pasteurization) are discussed. (26 references)

65-1701 IRRADIATION LEUKEMOGENESIS. (E.) Lawrence, J. S. (Dept. Med., U. California Sch. Med., Los Angeles). J.A.M.A. 190(12):1049-1054, 1964.

When the author reviewed the data from the literature on irradiation thresholds, sources of radiation exposure, dose rates and estimates made for Hiroshima and Nagasaki, a number of conclusions were reached. (1) The incidence of

leukemia can be increased by exposure to irradiation. (2) No positive statement can be made as to whether there is a threshold or linear relationship between irradiation and leukemia. (3) There is no evidence that chronic lymphatic leukemia is produced by irradiation. (4) Naturally occurring radioactive substances and cosmic rays may cause approx. 130 mrem exposure/yr. (5) Medical irradiation results in about 50% as much bone-marrow irradiation exposure as from natural sources. (6) Increased radiation exposure secondary to nuclear weapon testing is minimal but could become a source of trouble. (19 references)

65-1702 PULMONARY MALIGNANCY. (E.) Fort, G. E. (Nat. Life & Accident Insur. Co., Nashville, Tenn.). Proc. Med. Sect. Am. Life Convention 51:127-136, 1963.

A discussion and review is presented on the relationship of smoking and lung cancer. It was noted that the report by the American Cancer Society in 1954 showed the overall death rate to be 75% higher among heavy smokers than among nonsmokers; the death rate from heart disorders, all cancers and lung cancer was 95%, 156% and 400%, resp., higher than among nonsmokers. However, on the other hand, the Tobacco Institute, Inc. claims that positive evidence has not been given that tobacco in any form is the cause of lung cancer. Dr. R. A. Goodell reported that a mortality study made in 1939 on issued life insurance business of 1910-1912 comparing 5000 cigarette smokers to 5000 nonsmokers showed light smokers to have a mortality of 107% and regular smokers a mortality of 126% of nonsmokers. Dr. R. King, a thoracic surgeon, noted that he has not seen a single case of cancer of the lung in nonsmokers since he has been in practice. (No references)

65-1703 CANCER AND ATMOSPHERIC POLLUTION. (E.) Pybus, F. C. (Dept. Surg., U. Newcastle/Tyne, England). Newcastle Med. J. 28(2):31-66, 1963.

See CRA 2(8):#1557 and #1558, 1964. (36 references)

65-1704 INDUCED SYNTHESIS OF OXIDATIVE ENZYMES IN LIVER MICROSOMES BY POLYCYCLIC HYDROCARBONS AND DRUGS. (E.) Conney, A. H. (Wellcome Res. Lab., Tuckahoe, N. Y.) and J. J. Burns. Pp. 189-214 in Advances in Enzyme Regulation. I. Proc. Symp. Regulat. Enzyme Activity-Synthesis Norm. Neoplast. Liver; Indiana U. Sch. Med., Indianapolis; Oct. 1-2, 1962. Weber, G. (Ed.). Pergamon Press, Oxford, 1963, 420 pp.

A review and discussion on the stimulatory effect on liver microsomal enzymes of polycyclic hydrocarbons (20-methylcholanthrene (MC), 3,4-benzopyrene (BP), 1,2,5,6-dibenzanthracene, etc.) and

of such non-specific enzyme stimulators as phenobarbital, chlorcyclizine, aminopyrine, phenylbutazone, orphenadrine, etc. Young rats inj. once i.p. with BP or MC (25 or 125 mg, resp.) 24 hr. before admin. of the muscle relaxant zoxazolamine (Z) decreased the duration of Z paralysis from 730 min. in controls to 17 and 12 min., resp. Further metabolic studies on the mechanism of these stimulatory effects caused by foreign compounds in liver and hepatomas are discussed. (73 references)

65-1705 FACTORS THAT AFFECT THE STIMULATION OF THE MICROSOMAL DRUG ENZYMES INDUCED BY FOREIGN COMPOUNDS. (E.) Gillette, J. R. (Nat. Heart Inst., Bethesda). Pp. 215-223 in Advances in Enzyme Regulation. 1. Proc. Symp. Regulat. Enzyme Activity-Synthesis Norm. Neoplast. Liver; Indiana U. Sch. Med., Indianapolis; Oct. 1-2, 1962. Weber, G. (Ed.). Pergamon Press, Oxford, 1963, 420 pp.

A review and discussion are presented on the stimulation of the microsomal drug-metabolizing enzymes by foreign compounds including polycyclic hydrocarbons such as 20-methylcholanthrene and 3,4-benzpyrene. (14 references)

65-1706 NEW PROSPECTS IN CANCER BIOCHEMISTRY. (E.) Potter, V. R. (McArdle Mem. Lab., U. Wisconsin, Madison). Pp. 279-308 in Advances in Enzyme Regulation. 1. Proc. Symp. Regulat. Enzyme Activity-Synthesis Norm. Neoplast. Liver; Indiana U. Sch. Med., Indianapolis; Oct. 1-2, 1962. Weber, G. (Ed.). Pergamon Press, Oxford, 1963, 420 pp.

A review and discussion of early metabolic and enzymic changes in carcinogenesis (as seen in "minimal deviation" hepatomas) and other changes involving "intracellular feedback" and "organismic feedback". (See also CRA 3(1):#6, 1965.) (35 references)

65-1707 CANCER AND VIRUSES--PASSENGERS OR PATHOGENS? (E.) Chesterman, F. C. Ciba Sympos. 12(3):106-113, 1964.

A review and discussion on the experimental and clinical findings about oncogenic and oncolytic viruses are presented. (No references)

65-1708 INTERACTIONS OF HYDROCARBON CARCINOGENS WITH VIRUSES AND NUCLEIC ACIDS IN VIVO AND IN VITRO. (E.) Martin, C. M. (Dept. Med., Seton Hall Coll. Med., Jersey City, N. J.). Progr. Exp. Tumor Res. 5:134-156, 1964.

See CRA 3(4):#682, 1965. (81 references)

65-1709 CARCINOGENESIS THROUGH SOLID STATE SURFACES. (E.) Bischoff, F. (Santa

Barbara Cottage Hosp. Res. Inst., Cal.) and G. Bryson. Progr. Exp. Tumor Res. 5:85-133, 1964.

An extensive review is presented on solid state carcinogenesis. Discussed are the physical forms of the implant (organic polymers, metals, asbestos and glass, silicone rubber, etc.), histopathologic changes related to different periods of malignant change, carcinogenic role of inhibited inflammatory activity, the influence of powdered polymer on the precancerous capsule, effect of chronic irritation and prolonged trauma, role of the unbroken surface, host sensitivity and tissue specificity, malignant transformation of the fibroblast in vitro, and other histopathologic mechanisms. A section is devoted to the various aspects of cholesterol solid state carcinogenesis. (See also CRA 1(4):#697, 1963.) (169 references)

65-1710 THE CAUSE AND NATURE OF CANCER. (E.) Poel, W. E. (Grad. Sch. Public Health, U. Pittsburgh, Pa.). Progr. Exp. Tumor Res. 5:53-84, 1964.

In this extensive review, the theory of a susceptible normal cell + a carcinogen = a latent or active cancer cell was discussed by the author as being an unproven assumption. Also discussed were carcinogenesis without a carcinogen such as cell proliferation in vitro divorced from homeostatic mechanisms of the host, in vivo cell proliferation unimpaired by contact inhibition or hormonal repressors, etc., and the direct and indirect carcinogenic pathways. Various aspects of carcinogen-induced carcinogenesis by polycyclic hydrocarbons, X-rays and viruses as carcinogenic agents were also presented. (See also CRA 1(3):#359, 1963.) (74 references)

65-1711 DEFECTIVE CELL MATURATION, AN ALTERNATIVE TO ACCELERATED CELL DIVISION AS TARGET FOR CANCER THERAPY. (E.) Setälä, K. (Dept. Path., U. Helsinki, Finland). Progr. Exp. Tumor Res. 5:1-52, 1964.

This extensive review is based on the pathogenesis of mouse skin-tumor formation and the pharmacodynamic and radiation response of mouse skin which strongly supports the conclusion that malignant growth is primarily characterized by delayed and distorted cell maturation. In a section on benign and malignant epidermal hyperplasia, the author noted that his own studies indicate that the carcinogenic process in mouse skin is characterized by a nearly normal cell-replication rate which is accompanied by a delayed and misdirected cell maturation. (See also CRA 1(2):#146 and #200, 1963; ibid., (12):#2075; ibid., 2(3):#428, 1964; and ibid., 3(3):#427, 1965.) (125 references)

65-1712 CARCINOGEN-INDUCED TOLERANCE TO HOMOTRANSPLANTATION. (E.) Rubin, B. A. (Wyeth Lab., Inc., Radnor, Pa.). Progr. Exp. Tumor Res. 5:217-292, 1964.

An extensive review of the work of the author and others is presented on the effect of carcinogens (such as 20-methylcholanthrene; MC) on the homo-graft response in various strains of inbred mice, carcinogen treatment of various hybrids, non-genetic influences on homologous tumor growth, genetic specificity of tumors grown in homologous hosts, function of the route of carcinogen admin., transplantation of various tissues, correlation between carcinogenicity and tumor growth enhancement, mechanism of action studies, histologic changes in lymphoreticular tissues, immunological activities of carcinogens and the immunological implications of carcinogenesis. The author has found that 9,10-dimethyl-1,2-benzanthracene, MC, 1,2,5,6-dibenzanthracene, 3,4-benzpyrene and 10-methyl-1,2-benzanthracene (all skin painted 3x/wk. for 6 wk.) caused 75-100% progressive growth of the 6C3HED lymphosarcoma in DBA/2 mice. Solvents had no detectable effects while some compounds were intermediate (25% to 75% tumor growth): 5-methyl-, 9 methyl- or 4,5-dimethyl-1,2-benzanthracene. (114 references)

65-1713 CHROMOSOMES IN CANCER. (E.) Salkinder, M. C. (Poliomyel. Res. Found., Johannesburg, S. Africa). S. Afr. Med. J. 38(40):929-931, 1964.

Present knowledge about chromosome abnormalities in malignant diseases of man is summarized. X-rays, chemicals, age, and viruses are discussed briefly as causes of abnormal chromosome structure or number. Aneuploidy in acute leukemia, the Philadelphia and Christchurch (CH¹) chromosome defects in chronic myeloid and lymphatic leukemias, resp., and tumor-specific karyotypes are described. (35 references)

65-1714 BLADDER CANCER IN THE RUBBER INDUSTRY. (E.) Brit. Med. J. 1:329-330, 1965.

An editorial review of evidence that bladder cancer may develop as an occupational disease in the rubber industry is presented. (5 references)

65-1715 CELLULAR HEREDITARY MECHANISMS AND CANCER. (E.) Woods, M. W. (NIH, Bethesda) and D. Burk. Bios 36(1):3-13, 1965.

A review and discussion is presented on the general nature of cancer, metabolic patterns and regulation of tumor growth, the role of the mitochondria in metabolic regulation, mutant mitochondria and viruses, plant neoplasms, and cellular hereditary factors, viruses and cancer. (18 references)

65-1716 IS HUMAN LEUKEMIA A SOMATIC MUTATION OF BLOOD-FORMING CELLS DUE TO A VIRUS? (E.) Torrioli, M. (G. Mendel Inst. Genet. Med., Rome) and G. Torrioli-Riggio. Acta Genet. Med. (Roma) 13(4):349-368, 1964.

A review of the authors' work of more than 30 yr. is presented. (For details see CRA 1(6):#1117, 1963; and ibid., (11):#1959, 1964.) (17 references)

65-1717 SOIL AND STOMACH CANCER. (E.) Brit. Med. J. 1:1-2, 1965.

It is concluded in this review that further investigation on laboratory animals of the relation of the Zn:Cu ratio in the soil to stomach cancer incidence is needed. (22 references)

65-1718 PREMALIGNANT CHANGES OF THE LARGE INTESTINE. (Fr.) Giampalmo, A. (Inst. Anat., U. Genoa, Italy) and A. Castellaneta. Pathologica 55(831-832):381-390, 1963.

The authors review various types of potentially malignant alterations of the large intestine which include diffuse polyp adenomatosis, disseminated polyposis and particularly the Peutz-Touraine-Jeghers syndrome, isolated adenomatous polyps, chronic ulcerative colitis, and possibly, chronic productive "lymphomatous" colitis and planocellular metaplasia of rectal mucosa. (50 references)

65-1719 HAZARDS IN GASWORKS. (E.) Brit. Med. J. 1:876-877, 1965.

A discussion and review are presented on the exposure to products of coal carbonization which can give rise to cancer of the lung, bladder and scrotum as well as bronchitis. (See also CRA 3(7):#1804, 1965.) (15 references)

65-1720 THE PAPOVAVIRUS GROUP WITH EMPHASIS ON THE SIMIAN MEMBER, SV40. (E.) Melnick, J. L. (Dept. Virol., Baylor U. Coll. Med., Houston, Texas). Rev. Roum. Inframicrobiol. 1(1):27-39, 1964.

A review of the literature, including material previously abstracted as CRA 1(5):#945, 1963; ibid., (12):#2142, 1964; and ibid., 2(4):#729, 1964. (18 references)

65-1721 CARCINOGENIC SUBSTANCES IN THE EXTERNAL ENVIRONMENT AND THE FIGHT AGAINST THEM. (Cz.) Šabad, L. M. Cesk. Hyg. 8:349-356, 1963.

A translation from Russian of the paper published as CRA 1(3):#357, 1963. (No references)

65-1722 DERMATOLOGIC PARANEOPLASIAS. (Sp.) Sanchez Caballero, H. J. Arch. Argent. Derm. 14(3):151-188, 1964.

A review.

65-1723 INTERFERON. A REVIEW AND ANALYSIS OF RECENT OBSERVATIONS. (E.) Wagner, R. R. (Dept. Microbiol., Johns Hopkins U. Sch. Med., Baltimore, Md.). Am. J. Med. 38(5):726-737, 1965.

65-1724 CANCER OF THE MALE BREAST. (E.) Moss, N. H. (Dept. Surg., Albert Einstein Med. Ctr., Philadelphia, Pa.). Ann. N. Y. Acad. Sci. 114(2):937-950, 1964.

65-1725 SPONTANEOUS REGRESSION OF CANCER. (E.) Everson, T. C. (Dept. Surg., U. Illinois Coll. Med., Chicago). Ann. N. Y. Acad. Sci. 114(2):721-735, 1964.

65-1726 BOVINE LEUKEMIA. (E.) Dutcher, R. M. (South Jersey Med. Res. Found., Camden). Growth 29(1):1-5, 1965.

Review and discussion.

65-1727 VIRUS AND CANCER — A REVIEW. (E.) Cooney, J. P. (Am. Cancer Soc., New York, N. Y.). Assn. Life Ins. Dir. Am. 48:45-57, 1964.

65-1728 CHROMOSOMES AND CANCER. (E.) Sandberg, A. A. (Roswell Park Mem. Inst., Buffalo, N. Y.) and K. Yamada. CA 15(2):58-74, 1965.

65-1729 FACTORS AND MECHANISM OF TOBACCO TOXICITY. (Sp.) Matilla, V. (U. Madrid, Spain). Ciencias (Madrid) 29(2):79-96, 1964.

A review.

65-1730 FACTORS AND MECHANISM OF TOBACCO TOXICITY. (Sp.) Matilla, V. Med. Trop. (Madrid) 40(6):593-619, 1964.

A review.

65-1731 CARS AND ATMOSPHERIC POLLUTION. (It.) Cominelli, A. Ann. Sanit. Publicca 25(2):955-1005, 1964.

A review.

65-1732 CAUSES OF CERVICAL CANCER. (E.) Lancet 1:690-691, 1965.

A review.

65-1733 CELL TRANSFORMATION BY VIRUSES AS ILLUSTRATED BY THE RESPONSE OF HUMAN AND HAMSTER RENAL CELLS TO SIMIAN VIRUS 40. (E.)

Enders, J. F. (Dept. Res. Infect. Dis., Harvard U. Boston, Mass.). Harvey Lect. 59:113-153, 1965.

A review.

65-1734 CANCER OF THE CERVIX UTERI: REVIEW OF CAUSAL FACTORS WITH AN HYPOTHESIS AS TO ITS ORIGIN. (E.) Reid, B. L. (Dept. Obstet., U. Sydney, Australia). Med. J. Aust. 1(11):375-383, 1965.

65-1735 SCISSURA INFLAMMATION AND CANCER. (Fr.) Berard, J. and M. Rigot. Loire Med. 69(1):3-5, 1965.

A review.

65-1736 AIR POLLUTION, HEALTH AND MOTOR VEHICLE EQUIPMENT. A REVIEW OF THE MEDICAL AND BIOLOGICAL QUESTIONS FROM "MOTOR VEHICLES, AIR POLLUTION AND HEALTH". (Ger.) Gottberg, L. (Dept. State Health, Bad Godesburg, Germany) and W. Goerke. Zbl. Biol. Aerosolforsch. 12(2):97-125, 1964.

65-1737 THE PROBLEM OF CARCINOGENESIS. (Ger.) Petrow, C. (Charite Hosp., Humboldt U. Berlin). Wiss. Zschr. Humboldt Univ. Berlin (Math. Naturwiss.) 13(4):680-685, 1964.

65-1738 CHROMOSOMES IN HEMATOLOGY. (Sp.) Grignaschi, V. J. Sem. Med. (B. Air.) 126(1):55-65, 1965.

A review.

65-1739 REFERENCES ON SOME RECENT PROGRESSES IN THE KNOWLEDGE OF CANCER. (Sp.) Schavelzon, J. Sem. Med. (B. Air.) 126(1):37-46, 1965.

A review.

65-1740 TUMORS. (Jap.) Jamamura, Y. (Dept. Intern. Med., Osaka U. Sch. Med., Japan) and E. Tsubura. Naika (Clin. Intern. Med., Tokyo) 15(1):72-79, 1965.

A review.

65-1741 PRIMARY CARCINOMA OF THE LIVER. (Por.) Azevedo Da Bernarda, R. (Rainha D. Amelia Cent. Hosp., Beira, Mozambique). Coimbra Med. 11(1-636):287-296, 1964.

A review.

65-1742 OUTLINE OF THE RELATIONSHIP OF THE ATMOSPHERE TO CANCER., (Sp.) Solsona, F., R. Herranz y Srta and P. Martinez. Clin. Lab. (Zaragoza) 78(463):256-262, 1964.

A review.

65-1743 VARIATION IN THE CARCINOGENIC ACTIVITY OF VIRUSES PRODUCING TUMORS IN FOWL. (Sp.) Burmester, B. R. (Reg. Poul. Res. Lab., East Lansing, Mich.) and T. N. Fredrickson. Acta Oncol. (Madrid) 3(1):43-55, 1964.

A review.

65-1744 CANCER OF THE SKIN: GEOGRAPHY. (Fr.) Urbach, F. (Dept. Derm., Temple U. Med. Ctr., Philadelphia, Pa.). Med. Hyg. (Geneve) 23(678):244, 1965.

A review.

65-1745 BRONCHIAL CANCER AND OCCUPATION. (Fr.) Pierquin, L. (U. Nancy Sch. Med., France), C. Pernot and Y. Kessler. Arch. Mal. Prof. 26(3):113-125, 1965.

A review.

65-1746 CANCEROGENESIS AND OCCUPATIONAL PRE-CANCEROGENESIS IN STOMATOLOGY. (It.) Rabino, G. (Inst. Clin. Odontostomat., U. Turin, Italy). Minerva Stomat. 14(1):59-69, 1965.

A review.

65-1747 NATURAL OCCURRENCE AND SIGNIFICANCE OF CARCINOGENIC POLYCYCLIC, AROMATIC HYDROCARBONS. (Ger.) Gräff, W. (Inst. Hyg., U. Erlangen-Nurnberg, Germany). Med. Klin. 60(15):561-565, 1965.

A review.

65-1748 LEUKEMIA AND PHENYLBUTAZONE? (Ger.) Von Rechenberg, H. K. (Dept. Med., City Hosp., Baden, Germany). Schweiz. Med. Wschr. 95(16):525-527, 1965.

A review and discussion.

65-1749 BRONCHIAL CANCER: BLIND INCUBATION OF A CATASTROPHE. THE NECESSITY OF A SOMATIC ETIOLOGIC CONCEPTION, AWARENESS OF RESPONSIBLE PEOPLE AND PRACTICAL AND EFFECTIVE PREVENTIVE MEASURES. (Fr.) Zivy, P. Acta Phthisiol. (Paris) (64):2-32, 1964.

A review.

65-1750 PATHOLOGIC CONSEQUENCES OF FOODS INFESTED WITH ASPERGILLUS FLAVUS. (Fr.) Ferrando, R. (Dept. Nutrit., Nat. Sch. Vet. Med., Alfort/Seine, France) and N. Henry. Bull. Acad. Nat. Med. (Paris) 149(5-6):94-103, 1965.

A review.

65-1751 CONTRIBUTION TO HORMONAL CARCINOGENESIS IN THE HAMSTER. (Fr.) Riviere, M. R. (Dept. Exp. Med., Cancer Sci. Res. Inst., Villejuif/Seine, France), I. Chouroulinkov and M. Guerin. Acta Un. Int. Cancr. 20(6-7):1509-1511, 1964.

A review.

65-1752 THE EXPERIMENTAL TRANSMISSION OF HUMAN LEUKEMIA TO THE GUINEA PIG. (Sp.) Mas y Magro, F., Jr. (12 Calvo Sotelo, Alicante, Spain). Galicia Clin. 37(2):102-111, 1965.

A review.

65-1753 THE IMPORTANCE OF THE HOST-TUMOR RELATIONSHIP IN THE DEVELOPMENT OF HUMAN CANCER. (Fr.) Denoix, P. (Gustave-Roussy Inst., Villejuif/Seine, France). Acta Un. Int. Cancr. 20(6-7):1433-1438, 1964.

A review.

65-1754 BIOCHEMISTRY OF CANCER. (E.) Shapot, V. S. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Acta Un. Int. Cancr. 20(4-5):887-892, 1964.

A review.

65-1755 MUTAGENIC AND CARCINOGENIC ACTION OF ALKYLATING AGENTS. (Fr.) Verly, W. G. (Dept. Biochem., U. Liege, Belgium). Rev. Franc. Etud. Clin. Biol. 9(8):878-883, 1964.

The mutagenic action of various mono- and bifunctional alkylating agents is reviewed in terms of their reaction with DNA. Experimental studies of the mutagenic effect of such agents as ethylmethanesulfonate (EMS) on bacteriophage are described. The author's own work on the mutation of streptomycin-resistant (SR) strains of E. coli induced by EMS and myleran (M), as well as that induced in SR strains of Chlamydomonas eugametos by M, is reported. The possible mechanism of the carcinogenic action of alkylating agents such as M (reported by Maisin in the rat) is also discussed. (12 references)

65-1756 CANCER OF THE SCROTUM DUE TO TAR OR ITS DERIVATIVES. (Fr.) Carteaude, A. (Clin.

Dermosyph., Saint Louis Hosp., Paris). Presse Med. 72(55):3355-3360, 1964.

The author reviews incidences in the literature of cancer of the scrotum among chimney sweepers, cotton weavers ("mule spinners"), briquet handlers, workers in the tar, paraffin and oil refining industry, and metallurgists. Four illustrative case histories are presented of prickle cell epithelioma of the scrotum in metallurgists. The author discusses the etiology, pathogenesis, preventive aspects and treatment of these malignancies. He advocates the indemnification of these pts. since they are considered to be in the category of occupational diseases. (21 references)

65-1757 LEUKEMIC VIRUSES IN FRANCE. (Fr.) Jullien, P. (Radium Inst., Paris). Concour. Med. 86(48):6803-6809, 1964.

The author lists the various institutes in France actively engaged in viral research and reviews the characteristics of the principal diseases of known viral origin, including avian leukoses, bovine leukemias, murine leukemias, spontaneous lymphoid leukemia in Ak mice, lymphoid radiol leukoses, leukoses induced by the Friend and Rauscher viruses, and human leukemias. (No references)

65-1758 BOVINE LEUKOSIS. (Fr.) Lombard, C. (Cancer Res. Study Ctr., Nat. Sch. Vet. Med., Toulouse, France). Bull. Assn. Franc. Cancer 51(2):301-308, 1964.

In this review of bovine leukosis, the characteristics of the disease are presented: its existence only in a lymphoid form (as opposed to mouse leukosis) either lymphosarcomatous or aleukemic; its occurrence in both enzootic (the most frequent) or sporadic forms, the latter appearing as cutaneous leukosis or leukosis in young animals. The disease is caused by a filterable virus, but various factors such as heredity, environment or hormones also play an important role. (47 references)

65-1759 MODERN DRUGS AND CANCER. (Por.) Placco, R. A. (Regional Lab., Adolfo Lutz Inst., Sao Paulo, Brazil). Hospital (Rio) 66(4):885-891, 1964.

The author decries the exaggerated and uncontrolled use of various drugs (antibiotics, sulfonamides and estrogens mainly) and points out their toxic effects and possible relationship to increased cancer incidence. A wiser application of radioactive elements and isotopes in therapy is also recommended. (No references)

65-1760 ON THE CANCERIZATION RISK RESULTING FROM INTENDED OR CHANCE INCORPORATION OF CHEMICAL AGENTS INTO FOODS. (Fr.) Truhaut, (Gustave Roussy Inst., Villejuif/Seine, Paris). Acta Un. Int. Cancr. 19:472-476, 1963.

The author discusses the difficulties encountered in and the need for further experimentation in man of possible carcinogens which may become incorporated into foodstuffs. The importance of the time factor in the evaluation of a carcinogen is also discussed. (See also CRA 1(1):#33, 1963; and ibid., (9-10):#1688, 1964.) (17 references)

65-1761 THE STRUCTURES OF AFLATOXINS B AND G₁. (E.) Asao, T. (Dept. Chem., Mass. Ins. Tech., Cambridge), G. Büchi, M. M. Abdel-Kader, S. B. Chang, E. L. Wick and G. N. Wogan. J. Am. Chem. Soc. 87(4):882-886, 1965.

Structures and isolation of aflatoxins B₁ and G₁ are presented in detail and their LD₅₀ as well as induction of bile duct hyperplasia in White Pekin ducklings are reviewed. (22 references)

65-1762 HISTOGENETIC CORRELATIONS BETWEEN THE RETICULAR TISSUE AND THE DIFFERENT TYPES OF AVIAN LEUKOSIS AND RELATED NEOPLASMS. (E.) Löfliger, H.-C. (State Res. Inst. Small Anim. Breed., Celle, Germany). Nat. Cancer Inst. Monogr. 17:37-61, 1964.

A review is presented on the author's work and that of others pertaining to reticular or retothelial leukosis in fowls. It is suggested that 2 different groups of leukotic and reticular neoplastic diseases exist: the retothelial or myelogenous leukosis and related retothelial tumors; and the lymphomatosis and lymphosarcomas as the lymphogenous group of leukosis. (42 references)

PHYSICAL CARCINOGENESIS

65-1763 TRANSFER BY CELL-FREE FILTRATE OF
La VUFB LEUKAEMIA, ORIGINALLY INDUCED
BY X-RAY IRRADIATION. II. (E.) Libánský, J.
(Inst. Hemat., Prague, Czech.) and M. Lázníčka.
Neoplasma (Bratisl.) 11(4):379-384, 1964.

A continuation of previous work (see CRA 2(1):
1964), leukemia originally induced by
X-ray irradiation in C57 Black mice was successfully
transferred (s.c.) by a cell-free filtrate to
newborn and adult CBA mice. As early as passage
5 the latent period became shorter and incidence
almost 100% from passage 5 on and then the
latent period was fixed at 2-3 mo. In contrast
to the C57 Black mice, this strain allowed for
rapid standardization of the course of leu-
kemia. (See also the following abstract.)

65-1764 POST-IRRADIATION LEUKAEMIA IN CBA
MICE. (E.) Lázníčka, M. (Inst.
Hemat., Prague, Czech.), J. Libánský and
J. Svoboda. *Neoplasma* (Bratisl.) 11(4):385-388,
1964.

Male and female 6-12-week-old CBA mice received
single doses of 150 r at 3-day intervals up to
total irradiation dose of 600 r (measured in
water) and were followed for a period of 10 mo.
21/40 which survived for 2 mo. or more, 6/21
(28.2%) had lymphatic leukemia within 5-10 mo.
The remaining animals with no signs of leukemia and which
were sacrificed 10 mo. after irradiation, neo-
plastic changes (hepatomas) were seen in the
liver. (See also CRA 2(1):#73, 1964 and the
previous abstract.)

65-1765 OSTEOCHONDROMATA FOLLOWING IRRADIATION
IN CHILDREN. (E.) Cole, A. R. C.
(Sp. Sick Child., Toronto, Canada) and J. M. M.
Cote. *Pediatrics* 32:285-288, 1963.

Eight pts. with neuro- or nephroblastoma (7) or
eosinophilic granuloma (1) are described who
were successfully treated by surgery and X-ir-
radiation at the age of 3 yr. or less and sub-
sequently (17 mo.-9 yr. and 3 mo.) developed
osteochondromas within or adjacent to the ir-
radiated area.

65-1766 CASE REPORT: RECURRENT AND METASTATIC
CARCINOMA OF THE CERVIX FOLLOWING
IRRADIATION THERAPY. (E.) J. Mount Sinai Hosp.
J. Mount Sinai Hosp. 32(1):85-88, 91, 1965.

A case report of A. Z. Freudenheim is presented
of a 36-year-old woman with infiltrating Stage II
squamous carcinoma of the cervix treated with
X-ray irradiation, who died 10 mo. later of widespread
metastatic disease.

65-1767 OCCUPATIONAL HAZARD. (E.) Janower,
M. L. (Fruit St., Boston 114, Mass.).
J.A.M.A. 190(8):769-771, 1964.

A case history of a 50-year-old woman with
osteogenic sarcoma of the right ilium who was a
radium-dial painter from age 14-20 yr. is pre-
sented.

65-1768 RADIATION DERMATITIS AND RADIOGENIC
NEOPLASMS OF THE HANDS. (E.)
Hartwell, S. W., Jr. (Duke U. Med. Ctr., Durham,
N. C.), W. Huger, Jr. and K. Pickrell. *Ann. Surg.*
160(5):828-834, 1964.

Among 39 pts. with radiodermatitis of the hands
(19/39 due to carelessness in their professional
use of X-ray equipment, 20/39 due to treatment by
X-ray for some skin disorder), 9 had epidermoid
carcinoma (4/9 with axillary metastases), 2
fibrosarcoma, and 1 an undifferentiated malig-
nant skin tumor. Eighteen of the pts. were ex-
posed to X-ray for more than 4 yr. (16/18 were
medical practitioners), 19 were exposed for less
than 1 yr. and 2 for 2-4 yr.

65-1769 MESOTHELIOMAS IN HAMSTERS FOLLOWING
INTRAPLEURAL INJECTION OF ASBESTOS.
(E.) Smith, W. E. (Health Res. Inst., Fairleigh
Dickinson U., Madison, N. J.), L. Miller, J. Churg
and I. J. Selikoff. *J. Mount Sinai Hosp. NY*
32(1):1-8, 1965.

Male hamsters were given a single right intra-
pleural inj. of 25 mg (in 0.5 ml of 0.9% NaCl)
of processed soft chrysotile (SC; 67 μ fiber
length), harsh chrysotile (HC; 36 μ) or amosite
(A; 18 μ) and were then fed either 1% SC (SC and
HC groups) or A (A group) baked into the daily
ration. Extensive pleural and pericardial ad-
hesions were found in hamsters treated with each
of the 3 varieties of asbestos tested. Of the
tumors located between the lung and chest wall,
1 found in an A-treated hamster resembled the
epithelial type of mesothelioma in man, while
another resembled the mixed epithelial and fibrous
type; both animals had numerous metastases. The
2 large tumors found in hamsters treated with
HC and another small tumor in an A-treated animal
resembled the fibrous type of mesothelioma in man;
the former tumor was successfully transplanted.
No tumors were found in the pleural space of
animals treated with SC, but islands of epithelial-
like cells were seen; one of these animals had a
fibrosarcoma enclosing a deposit of asbestos
fibers in the axilla.

65-1770 KIDNEY TUMORS AND IRRADIATION.
PATHOGENESIS OF KIDNEY TUMORS IN IR-
RADIATED RATS. (E.) Berdjis, C. C. (Walter

Reed Army Med. Unit., Fort Detrick, Md.).
Oncologia (Basel) 16:312-324, 1963.

Sprague-Dawley or hybrid Fischer (FAC-F₁) rats were admin. total body (500 r) X-irradiation or irradiation to one (900 r) or both (2 x 500 r) kidneys with sacrifice 12-24 mo. later. Cortical tumors of 1 or both kidneys occurred in about 35% of the FAC-F₁ and 38% of the Sprague-Dawley rats. A few controls (5%-10%) and >50% of the irradiated rats developed nephrosclerosis and varying degrees of arteriosclerotic changes affecting both kidneys. The tumors were similar in structure to those of mice and man, being multiple, bilateral, multicentric, miliary and essentially cortical as well as of apparent tubular origin as in man. (See also CRA 2(1): #23, 1964.)

65-1771 ACUTE LEUKAEMIA FOLLOWING ADMINISTRATION OF RADIOIODINE FOR THYROTOXICOSIS. (E.) Thomson, J. A. (Dept. Med., Royal Infirm., U. Glasgow, Scotland). Lancet 2:978-979, 1963.

A 40-year-old woman with acute leukemia that followed therapy with ¹³¹I for thyrotoxicosis showed no chromosomal abnormality, suggesting that no causative relationship between ¹³¹I and leukemia existed in this case.

65-1772 MULTIPLE CARCINOMATOUS GROWTHS AND SKIN SARCOMA IN A PATIENT WITH CHRONIC ROENTGEN-RAY DERMATOSIS. (E.) Kuta, A. (1st Clin. Derm., Charles U., Prague, Czech.). Radiobiol. Radiother. (Berlin) 4:231-240, 1963.

A 68-year-old man who inadvertently received an overdose of X-irradiation for sycosis barbae and eczema on the hands developed some 30 yr. later chronic roentgen-ray dermatosis on the face, followed by the appearance in the same region of 8 malignant tumors (4 spinocellular carcinomas, 3 basal cell carcinomas and 1 polymorphocellular sarcoma).

65-1773 REDUCTION OF STRONTIUM-90 BONE CANCER BY ZIRCONIUM CITRATE. (E.) Zander-Principati, G. E. (Dept. Path., Marquette U. Sch. Med., Milwaukee, Wis.) and J. F. Kuzma. Int. J. Radiat. Biol. 8(5):427-437, 1964.

When groups of approx. 500 virgin female 8-10-week-old CF₁ mice each were treated with a single i.p. inj. of a high (0.44 μ C/g), intermediate (0.34 μ C/g) or low (0.20 μ C/g) dose of Sr⁹⁰, while other similar groups were given the same doses of Sr⁹⁰ but were treated with i.p. zirconium citrate (ZC; 5 mg/inj. 15 min. after Sr⁹⁰ and at 3 succeeding hourly intervals) or ZC (as above) + Diamox (D; 0.5 mg 1 hr. before Sr⁹⁰ with another dose with last inj. of ZC), the frequency (per cent) of animals with bone tumors after 147 days and the reduction in frequency (in percent)

was as follows: high Sr⁹⁰, 21.7% and --; middle Sr⁹⁰, 15.2% and --; low Sr⁹⁰, 5.0% and --; high Sr⁹⁰ + ZC, 8% and 63.1%; middle Sr⁹⁰ + ZC, 8.4% and 44.7%; low Sr⁹⁰ + ZC, 1.4% and 72%; high Sr⁹⁰ + ZC + D, 10.3% and 52.5%, resp. About 17%-53% of the tumor-bearing animals had multiple tumors. The mean times to appearance of the tumor for the animals treated with the intermediate and low dose of Sr⁹⁰ + ZC were 329 days (Sr⁹⁰ only, 278 days) and 341 days (Sr⁹⁰ only, 307 days), resp. No malignant bone tumors were seen in the control mice or those given ZC alone or + D. The principal tumor sites were the femur, tibiae, spine and pelvis; 50% of tumor-bearing mice had metastases. Mediastinal (thymic) tumors classified as lymphoma or lymphosarcomas were found at autopsy in 313 mice. The bone tumors were classified as osteogenic sarcomas.

65-1774 THYMIC TUMOR INCIDENCE AND LONGEVITY OF FEMALE MICE IRRADIATED WITH EITHER FISSION NEUTRONS OR Co⁶⁰ γ -RAYS AT DIFFERENT DOSE RATES. (E.) Vogel, H. H., Jr. (Dept. Biol. Res., Argonne Nat. Lab., Ill.) and D. L. Jordan. Acta Un. Int. Cancr. 20(4-5):1159-1163, 1964.

See CRA 1(8):#1450, 1963.

65-1775 DATA CONCERNING THE GASTROINTESTINAL TUMOURS INDUCED BY RADIOACTIVE CERIUM. (E.) Lebedeva, G. A. (M. Chukinskaia 15, Kv. 104, Moscow D 182). Acta Un. Int. Cancr. 20(4-5): 1157-1158, 1964.

See CRA 1(5):#815, 1963.

65-1776 IRRADIATION INDUCED NEOPLASTIC AND GIANT CELLS IN EARTHWORMS. (E.) Hancock, R. L. (Hulls Cove, Maine). Experientia 21(1):33-34, 1965.

Tumors resembling the myoblastoma of vertebrates were induced by X-ray in earthworms (Lumbricus terrestris).

65-1777 STUDIES ON CARCINOGENESIS AND THE USEFULNESS OF POLYESTER YARN IN ALLOPLASTY. (E.) Kuś, H. (Dept. Plast. Res., U. Wrocław Sch. Med., Poland), K. Kawecki and E. Szewczak. Arch. Immun. Ther. Exp. 12(6):730-739, 1964.

In mature male and female rats implanted with polyester knitted nets (piece 2 x 2 cm) made from Td 40 yarn and sutured with polyester thread into a s.c. defect, placed without suturing between the abdominal fascia and s.c. tissue or placed in the peritoneal cavity over the right lobe of the liver no neoplastic changes were seen after 24 mo.

65-1778 CHROMOSOME CHANGES FOLLOWING IRRADIATION IN MAMMALS. (E.) Nowell, P. C. (Dept.

Path., U. Pennsylvania Sch. Med., Pa.), D. A. Hungerford and L. J. Cole. Ann. N. Y. Acad. Sci. 114(1):252-258, 1964.

65-1779 RADIATION-INDUCED THYROID CARCINOMA. (E.) Pifer, J. W. (Dept. Exp. Radiol., U. Rochester Sch. Med., N. Y.) and L. H. Hempelmann. Ann. N. Y. Acad. Sci. 114(2):838-848, 1964.

65-1780 CHROMOSOME ABERRATIONS IN IRRADIATED HUMAN SUBJECTS. (E.) Bender, M. A. (Dept. Biol., Oak Ridge Nat. Lab., Tenn.). Ann. N. Y. Acad. Sci. 114(1):249-251, 1964.

65-1781 FRACTIONATED, LOW DOSE-RATE IRRADIATION OF MICE WITH FISSION NEUTRONS AND CO⁶⁰ GAMMA-RAYS. Vogel, H. H., Jr. (Dept. Biol., Argonne Nat. Lab., Ill.) and D. L. Jordan. Ann. N. Y. Acad. Sci. 114(1):185-188, 1964.

Induction of thymic lymphomas is reported.

65-1782 ACCELERATED INDUCTION OF HEPATOMAS IN FAST NEUTRON-IRRADIATED MICE INJECTED WITH CARBON TETRACHLORIDE. (E.) Cole, L. J. (Dept. Biol., U.S. Naval Radiol. Def. Lab., San Francisco, Cal.) and P. C. Nowell. Ann. N. Y. Acad. Sci. 114(1):259-267, 1964.

65-1783 THE ROLE OF ASBESTOSIS IN THE DEVELOPMENT OF PLEURAL MESOTHELIOMA. (Fr., Abstract) Turiaf, J. Presse Med. 73(8):437, 1965.

A case report.

65-1784 ASBESTOS BODIES IN HUMAN LUNGS AT AUTOPSY. (E.) Cauna, D. (230 Lothrop St., Pittsburgh, Pa.), R. S. Totten and P. Gross. J.A.M.A. 192(5):371-373, 1965.

65-1785 THE CANCER HAZARDS OF INDUSTRIAL AND ACCIDENTAL EXPOSURE TO RADIOACTIVE ISOTOPES. (E.) Hasterlik, R. J. (Argonne Cancer Res. Hosp., Chicago, Ill.), A. J. Finkel and C. E. Miller. Ann. N. Y. Acad. Sci. 114(2):832-837, 1964.

65-1786 LATE RADIATION EFFECTS OF NEOPLASIA AND OTHER DISEASES IN JAPAN. (E.) Angevine, D. M. (Dept. Path., U. Wisconsin Sch. Med., Madison) and S. Jablon. Ann. N. Y. Acad. Sci. 114(2):823-831, 1964.

65-1787 THE BIOLOGY OF RADIATION-INDUCED CANCER. (E.) Loutit, J. F. (Med. Res. Council,

Harwell, Berks, England). Ann. N. Y. Acad. Sci. 114(2):816-822, 1964.

65-1788 MYELOID LEUKEMIA IN THE MOUSE. (E.) Upton, A. C. (Dept. Biol., Oak Ridge Nat. Lab., Tenn.), V. K. Jenkins and J. W. Conklin. Ann. N. Y. Acad. Sci. 114(1):189-202, 1964.

65-1789 LEUKEMOGENESIS IN MAN. (E.) Burch, P. R. J. (Dept. Med. Physics, U. Leeds, England). Ann. N. Y. Acad. Sci. 114(1):213-224, 1964.

65-1790 MULTIPLE HEPATIC HEMANGIOSARCOMAS FOLLOWING CEREBRAL ANGIOGRAPHY WITH THOROTRAST. (Ger.) Hohenstatt, H. (Med. Clin., City Hosp., Heilbronn, Germany). Hippokrates 36(6):227-228, 1965.

A case report.

65-1791 RADIOGENIC CANCER OF THE THYROID. (Fr.) Dorffel, E. W. (Dept. Oncol., Charite Hosp., Berlin), N. Mangakis and R. Vollmar. Acta Un. Int. Cancr. 20(4-5):1175-1177, 1964.

Case reports.

65-1792 THE CORPUSCULAR DECOMPOSITION PRODUCT OF RADON AND THE LUNGS. (Ger.) Frey, W. Zbl. Biol. Aerosolforsch. 12(1):1-11, 1964.

65-1793 LEUKEMOGENIC EFFECT OF RADIOACTIVE PHOSPHORUS IN ADULT AND FETALLY EXPOSED BALB MICE. (E.) Holmberg, E. A. D. (Inst. Hemat. Invest., Nat. Acad. Med., Buenos Aires, Argentina), C. Dosne de Pasqualini, E. Arini, A. Pavlovsky and S. L. Rabasa. Cancer Res. 24(10):1745-1748, 1964.

65-1794 INTERACTION OF URETHAN AND FRACTIONATED OR REGIONAL X-RADIATION IN MICE: LUNG TUMOR AND LEUKEMIA INCIDENCE. (E.) Foley, W. A. (Dept. Path., U. Minnesota, Minneapolis) and L. J. Cole. Cancer Res. 24(11):1910-1917, 1964.

65-1795 THE INDUCTION OF RADIOLEUKEMIAS IN XVII/G MICE AND IN F₁ HYBRIDS (XVII/G x AkR). (Fr.) Rudali, G. (Dept. Genet., Curie Found., Paris), P. Pujol, P. Jullien and J. Reverdy. Bull. Assn. Franc. Cancer 51(2):153-157, 1964.

In XVII/G mice, aged 0-28 days, exposed to X-irradiation (120 r/wk. x 5), the leukemia incidence was 3/20 (15%) and the latent period (LP) 218 days; other tumors included 2/20 pulmonary, 2/20 salivary and 1/20 seminoma. The same treatment in 40-68-day-old XVII/G mice resulted in 3/41 (7%) with leukemia (LP 228 days), 12/41 with pulmonary tumors

and 2/41 with salivary gland tumors. The differences were not statistically significant. Of 115 F₁ (XVII/G x AkR) hybrid mice, aged 0-28 days, similarly treated, 81 (70%) had leukemia (LP 205 days), 6 had ovarian and 3 pulmonary tumors; in 42-71-day-old mice, results showed 36/73 animals with leukemia (50%; LP 231 days), 3/73 with ovarian and 3/73 with pulmonary tumors. Among adult irradiated hybrids, a higher incidence of leukemia was seen in females (61%) as compared to males (37%). (See also CRA 1(12): #2069, 1964.)

65-1796 THE TUMORIGENIC ACTION OF X-RAYS IN THE DROSOPHILA (D. MELANOGASTER) AND ITS QUANTITATIVE DEVELOPMENT DURING ONTOGENESIS. (Fr.) Ghelelovitch, S. (Pasteur Lab., Radium Inst., Paris). Bull. Assn. Franc. Cancer 51(2): 203-224, 1964.

In studies on the tumorigenic action of X-rays on D. melanogaster (strain cl tu), a decreased sensitivity was seen when larvae were irradiated (600-2,400 r) at 48 hr. as compared to those irradiated at 22 hr.; by increasing the dose, melanotic tumors were formed in nearly all larvae of all ages. Tumorigenic sensitivity remained the same within each developmental stage, regardless of age at the time of irradiation. Sensitivity, however, changed with passage from one stage to another; embryos and Stage 1 larvae were equally sensitive, but irradiation was no longer tumorigenic from the pupal stage on. In Stage 3 larvae, a threshold value (600 r) was noted for the tumorigenic action of X-rays. Among Drosophila, no correlation was seen between sensitivity to the tumorigenic and lethal action of X-rays. Irradiation increased tumor incidence without changing the latent period. Individuals belonging to the same strain and in the same developmental stage did not show the same degree of sensitivity: among F₁ heterozygotes (obtained by crossing the tu strain with the non-tumor forming strain 8) approx. 20% were refractory to the tumorigenic action of X-rays. (See also CRA 2(2):#193, 1964.)

65-1797 EARLY LEUKEMIA APPEARING IN NEWBORN AND YOUNG ADULT AKR MICE EXPOSED TO X-RAYS. (Fr.) Jullien, P. (Curie Found., Paris) and G. Rudali. Bull. Assn. Franc. Cancer 51(2): 147-152, 1964.

AkR mice were exposed to X-irradiation (120 r x

5 at weekly intervals; total 600 r) at the age of 0-28 days and 45-73 days. No difference was seen in leukemia incidence (81%-82%), but the age at which leukemia appeared and the av. latent period were significantly diminished in newborn mice (4.8 and 3.9 mo., resp.) as compared to young adults (7.5 and 5.2 mo., resp.). In mice exposed to X-irradiation (150 r x 4 at weekly intervals; total 600 r) at the age of 0-15, 15-30 and 30-45 days, a significantly shortened latent period (4.2 mo.) was seen for mice of the 15-30-day-old group as compared to the 30-45-day-old group (5.2 mo.). No significant differences were seen in leukemia incidence (82%-87%) among the various groups, including controls. (See also CRA 1(12): #2069, 1964; and ibid., 3(3):#432, 1965.)

65-1798 RELATION BETWEEN EXPOSURE TO ASBESTOS AND MESOTHELIOMA. (E.) Selikoff, I. J. (Dept. Med., Mt. Sinai Hosp., New York, N. Y.), J. Churg and E. C. Hammond. New Eng. J. Med. 272(11):560-565, 1965.

Of 2500 consecutive autopsies (1020 males) seen from 1953-64, the causes of death in the 26 cases of asbestosis was mesothelioma (7) (pleura 4, peritoneum 3), bronchogenic carcinoma (7) and all others (12). In this autopsy series no case of mesothelioma in the absence of asbestosis was seen. Asbestos bodies were detected in 5/19 pleural and 7/26 peritoneal cases of mesothelioma. Of 307 consecutive deaths (1943-1964) among asbestos-insulation workers in New York and New Jersey, the cause of death was as follows: bronchogenic carcinoma, 17.3%; gastrointestinal cancer, 11.1%; pleural mesothelioma, 1.3%; peritoneal mesothelioma, 1.9%; all other neoplasms, 8.8%; asbestosis, 5.5%; all other causes, 54.1%. (See also CRA 2(6): #1177, 1964.)

65-1799 ASBESTOSIS AND MALIGNANT DISEASE. (E.) New Eng. J. Med. 272(11):590-591, 1965.

In a review (10 references) and discussion on the association between asbestos inhalation and malignant disease (especially bronchogenic carcinoma and pleural and peritoneal mesothelioma) it was noted that the morbidity and mortality of asbestos exposures (see preceding abstract) are of grave concern. Data has shown that exposures to a mixture of materials, one of which is chrysotile, a form of asbestos chiefly used in the United States; are correlated with an increase in the incidence of mesothelioma.

See also abstract nos.: 1683, 1697, 1701, 1709, 1710, 1936, 1954

CHEMICAL CARCINOGENESIS

5-1800 ISONICOTINIC ACID HYDRAZIDE AND NEOPLASMS. (Fr.) Loscalzo, B. (Inst. Pharmacol., U. Naples, Italy). Arch. Int. Pharmacodyn. 152(1-2):249-251, 1964.

The admin. of isonicotinic acid hydrazide (30 mg/kg/day in the drinking water) for approx. 1 yr. to 60 albino rats did not induce tumors and did not modify the development of transplanted Oberling-Guerin and Guerin myelomas.

5-1801 DISTRIBUTION AND SPECIES LIMITATION OF THE ADRENAL LESIONS INDUCED BY 9,10-DIMETHYLBENZ(a)ANTHRACENE. (E.) Cefis, F. (Dept. Oncol., Chicago Sch. Med., Ill.) and M. Goodall. Am. J. Path. 46(2):227-243, 1965.

Of 7-10-week-old rats (Sprague-Dawley, August, RC), mice (Swiss, MA, C57Bl, AKR), albino guinea pigs or golden hamsters to which a single dose of partially purified 9,10-dimethyl-1,2-benzanthracene (18-112 mg/100 g; DMBA) was admin. by gavage, only the rats (all strains) showed extensive adrenal necrosis within 3 days; the lesions were not restricted to the inner zones of the cortex but involved the zona glomerulosa and the medulla as well. All the treated animals (given 18 mg or more) showed bone marrow destruction and severe depletion of the lymphocytes of the spleen, thymus and lymph nodes. All the species suffered a similar mortality rate. The authors suggest that the current theory relating to the steric resemblance between DMBA and adrenal steroid hormones may not be an adequate explanation of the results.

5-1802 TRANSPLANTABLE THYROID CARCINOMA INDUCED BY THYROTROPIN. ITS SIMILARITY TO HUMAN HURTHLE CELL TUMORS. (E.) Sinha, D. (Dept. Physiol., Michigan State U., East Lansing), J. Pascal and J. Furth. Arch. Path. (Chicago) 9(2):192-198, 1965.

A more detailed account of the paper previously reported as CRA 2(6):#1074, 1964.

5-1803 POLYNUCLEAR HYDROCARBON CARCINOGENS IN COOKED MEAT AND SMOKED FOOD. (E.) Iijinsky, W. (Dept. Oncol., Chicago Sch. Med., Ill.) and P. Shubik. Industr. Med. Surg. 34(2):152-154, 1965.

The analysis of various foods and liquid smoke showed that the conc. of polycyclic aromatic hydrocarbons (PAH) in bacon, smoked salmon and smoked haddock were in the range of a few parts per billion or less and most of those detected were not carcinogenic. A low conc. of benz(a)pyrene (BP) was present in the smoked fish. When the conc. of the hydrocarbons was determined again in charcoal-broiled steaks (see CRA

3(2):#250, 1965 for first study) purchased from a restaurant, the conc. were of the same order but a little lower than those in the first analysis: BP conc. was 5 µg/kg as compared with 8 µg/kg. Since analysis showed the absence of N-containing PAH, the possible contribution due to pyrolysis of the fat which dripped from the meat was assessed in fatty, charcoal-broiled barbecued ribs purchased from a restaurant. Analysis showed the following (in µg/kg): anthracene, 7.1; anthanthrene, 1.1; benz(a)anthracene, 3.6; benzo(g,h,i)perylene, 4.7; BP, 10.5; benz(e)pyrene, 7.5; chrysene, 2.2; coronene, 4.2; fluoranthene, 49; phenanthrene, 58; perylene, 1.5 and pyrene, 42. The conc. of PAH was generally higher than in the steaks (e.g., BP 10.5 compared to 8 and 5 for 2 steaks).

65-1804 A STUDY OF THE CONCENTRATIONS OF POLYCYCLIC AROMATIC HYDROCARBONS IN GAS WORKS RETORT HOUSES. (E.) Lawther, P. J. (St. Bartholomew's Hosp. Coll. Med., London, E. C. 1), B. T. Commins and R. E. Waller. Brit. J. Indust. Med. 22(1):13-20, 1965.

The conc. of various polycyclic aromatic hydrocarbons was determined in gas works retort houses of several types. Analysis of long-period samples of the air from 1 retort house showed the following (µg/m³): 1,2-benzpyrene, 2.5; coronene, 0.5; 1,12-benzoperylene, 2.5; 3,4-benzpyrene (BP), 4.8. The mean conc. of BP (3 µg/m³) was >100x the normal level in the city of London. The conc. above the retorts in an old horizontal retort house was >200 µg/m³ (about 10,000x that in the city); in vertical houses there were no working areas where men could be exposed to such conc. Mask samples indicated a mean exposure to BP during an 8-hr. shift ranging from 3-1,136 µg in different retort houses.

65-1805 THE METABOLISM OF A CARCINOGENIC AGENT, 4-NITROQUINOLINE-N-OXIDE. (Jap., Abstract) Hashimoto, Y. (Dept. Biochem., Nippon U. Sch. Med., Japan), M. Terasawa and N. Toriyama. Seikagaku (J. Jap. Biochem. Soc.) 36(9):557, 1964.

The authors report the existence in the liver of albino rats of an enzyme (4-nitroquinoline-N-oxide (NQO) reductase), which reduces NQO to 4-hydroxylaminoquinoline-N-oxide. The purified enzyme showed highest absorption spectra at 280 mµ and 410 mµ. The enzymatic activity was highest in phosphoric acid buffer soln. and was inhibited in citric acid buffer soln.

65-1806 CARCINOGENIC HYDROCARBONS. EFFECTS ON SUCKLING RAT TRACHEA IN ORGAN CULTURE. (E.) Crocker, T. T. (Dept. Med., U. California Sch. Med., San Francisco), B. I. Nielsen and

I. Lasnitzki. Arch. Environ. Health (Chicago) 10(2):240-250, 1965.

A more detailed account of the material previously abstracted in CRA 2(7):#1304, 1964.

65-1807 RAT LIVER PARENCHYMAL CELL FUNCTION DURING AZO DYE CARCINOGENESIS. (E.) Watters, C. (Cancer Inst. Montreal, Canada) and A. Cantero. Cancer Res. 25(1):67-71, 1965.

A more detailed account of CRA 1(9-10):#1716, 1964. The azo dye used was 4-dimethylaminoazobenzene and the noncarcinogen was 2-methyl-4-dimethylaminoazobenzene.

65-1808 REDUCTION OF NORMAL MUSCLE ANTIGENS IN RAT TUMORS OF MUSCLE ORIGIN INDUCED BY INTRAMUSCULAR INJECTIONS OF 20-METHYLCHOLANTHRENE. (E.) Fel, V. J. (Inst. Cytol., USSR Acad. Sci., Leningrad) and T. N. Tsikarishvili. Cancer Res. 24(10):1675-1677, 1964.

A study of 6 primary rat tumors of muscle origin induced by i.m. inj. of 20-methylcholanthrene (3 mg in 0.2 ml sunflower oil) showed that after conversion to malignant cells (within 6 mo.) the synthesis of antigens specific for normal muscle tissue decreased and this process affected both the myofibrillar and the sarcoplasmic proteins. The actomyosin content in tumor tissue was considerably less than the content in normal muscle tissue and this was greater than the decrease in sarcoplasmic proteins. It was noted that according to present theories, the antigenic deletion is based on quantitative changes in the synthesis of organospecific antigens.

65-1809 FURTHER ASPECTS OF LYMPHOSARCOMA IN XENOPUS (THE SOUTH AFRICAN CLAWED TOAD). (E.) Balls, M. (Virus Lab., U. California, Berkeley). Cancer Res. 25(1):7-11, 1965.

Of 10 immature Xenopus laevis laevis immersed and anesthetized daily for 40 days in 5% aqueous urethan (U), 3 developed lymphoid tumors involving the liver, spleen, kidneys, fat-bodies or heart; no tumors developed in controls not immersed in U. Of 25 immature Xenopus given 10 weekly inj. of U (0.1 ml of 1% soln.), 13 developed lymphoid tumors which involved the liver, spleen, kidneys and lungs, while 25 animals treated with inj. of a physiologic soln. (Niu and Twitty) had only 5 lymphosarcomas of the spleen. U increased the incidence of lymphosarcoma when used as an anesthetic in experiments involving forelimb autografts or homografts to the dorsal lymph sac. The transfer of histologically normal or tumorous tissues from tumor-bearing Xenopus and lymphosarcoma transfers to adult Xenopus eyes also caused lymphosarcomas to develop. (For related studies in the Xenopus, see CRA 2(3):#509; ibid., (4):#674, 1964; ibid., 3(1):#101 and #201;

ibid., (3):#478 and #635, 1965; and ibid., 3(7):#2027, 1965.)

65-1810 MORPHOLOGICAL CHANGES IN THE TISSUE OF THE SALIVARY GLAND DEVELOPING AFTER INTRODUCTION OF 20-METHYLCHOLANTHRENE IN THE GLAND. (Jap., Abstract) Suzuki, S. (Dept. Path., Tokyo Dent. Coll., Japan) and Y. Kuwana. Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:126, 1964.

20-Methylcholanthrene (0.2 mg) was introduced directly into the mid portion of the submandibular duct of 43 DD strain mice and histologic observations were made at intervals from 1-159 days after the operation. Foreign body giant cells were noted in the tissue surrounding the site of inj. on day 4 and increased up to day 8. Nodules formed in the duct by day 30. After 60 days, cystadenomatous carcinoma and epidermoid carcinoma were observed; sarcomas were recognized by day 90. The carcinomas gradually invaded the intra-glandular muscle tissue and caused destructive changes. These muscle cells showed atypical changes with time suggesting the possibility that sarcoma may have originated in this muscle tissue.

65-1811 MORPHOLOGICAL CHANGES IN THE LIVER ACCOMPANYING STIMULATION OF MICROSOMAL DRUG METABOLIZING ENZYME ACTIVITY BY PHENOBARBITAL, CHLORDANE, BENZPYRENE OR METHYLCHOLANTHRENE IN RATS. (E.) Fouts, J. R. (Dept. Pharmacol., Iowa State U. Coll. Med., Iowa City) and L. A. Rogers. J. Pharmacol. Exp. Ther. 147(1):112-119, 1965.

In male Long-Evans rats treated with 1 i.p. inj. of benzpyrene or 20-methylcholanthrene (both at 20 mg/kg) with sacrifice 72 hr. later, only a few microsomal drug metabolizing enzymes were stimulated and both agents did not appear to cause any pronounced increase in hepatic cell smooth-surfaced endoplasmic reticulum (SER). Both phenobarbital and chlordane stimulated a variety of microsomal drug metabolisms and caused marked proliferation of SER.

65-1812 OVARIAN TUMORIGENESIS DUE TO DIFFERENTIAL EXTRAOVARIAN DISTURBANCES. QUANTITATIVE ASPECTS. (Fr.) Lipschutz, A. (Inst. Exp. Med., Nat. Dept. Health, Santiago, Chile), V. I. Panasevich, H. Cerisola and A. Alvarez. C. R. Acad. Sci. (Paris) 259(25) (Group. 12):4829-4832, 1964.

See CRA 2(6):#1093, 1964.

65-1813 EXPERIMENTAL EPIDERMAL HYPERPLASIA IN MICE. RELATION TO CARCINOGENESIS. (E.) Skjaeggstad, Ø. Acta Path. Microbiol. Scand. (Suppl. 169):1-126, 1964.

In a study of epidermal cell kinetics, the cell

nuclei of hairless mice were labeled *in vivo* by radioactive thymidine (i.p.) and various agents in benzene were painted on the skin 3 days before or 1-4 days after labeling. An initial significant increase in cell loss accompanied by an increase of cell renewal, followed by a period of decreased cell loss, occurred after 20-methyl-cholanthrene (MC; 1%) and 9,10-dimethyl-1,2-benzanthracene (DMBA; 0.5%). A similar cell loss of smaller and shorter duration occurred after turpentine (undiluted), mustard oil (6%), and Tween 60 and 1,2-benzanthracene; cantharidin caused a cell loss of proportions similar to that due to carcinogens. Depending on the conc. used, the following carcinogens also produced increased cell loss: 3,4-benzpyrene, 4-nitro-quinoline-N-oxide, 7,9-dimethylbenzacridine and β -propiolactone. At doses which previously induced very few papillomas and no carcinomas, MC clearly increased cell loss. No significant disturbances in the cells occurred after urethan, naphthalene, pyrene, anthracene and phenanthrene. Although the kinetics of the epidermal hyperplasia seemed to be the same with all types of agents, the author notes that there are probable quantitative differences between the carcinogenic and noncarcinogenic agents.

65-1814 CONTENT OF 3,4-BENZPYRENE IN PARAFFIN SUBJECTED TO VARIOUS DEGREES OF PURIFICATION. (Rus.) Gorelova, N. D. (Inst. Oncol., USSR Acad. Med. Sci., Moscow) and P. P. Dikun. Vop. Onkol. 11(3):115-116, 1965.

No 3,4-benzpyrene (BP) was detectable in paraffin processed with 20% fuming sulfuric acid + 20% bleaching clay (BC) for 10 or 32 hr. with or without an ethanol wash. After processing with 20% dilutions of two commercial sulfuric acids (91%-92% and 98%) + 10% BC, 1.0 and 0.53 or 0.66 $\mu\text{g/kg}$ of BP were found, resp.

65-1815 BIOCHEMICAL CHANGES IN RAT LIVER TISSUE FOLLOWING THE ADMINISTRATION OF HEPATIC CARCINOGENS OF VARIOUS CHEMICAL STRUCTURE. (Rus.) Rubenchik, B. L. (Ukrainian Sci. Res. Inst. Nutrit., Kiev, USSR). Vop. Onkol. 11(3):63-68, 1965.

Liver changes were studied in white male rats (total 200; wt. 150-200 g) fed with p-dimethyl-aminoazobenzene (DAB; 0.06%), thioacetamide (TA; 0.03%) or tartrazine (TZ; 0.2%) and sacrificed 2-26 wk. later. Tumors (mostly cholangio-cellular cancer) were visible in about 20-22 wk. following DAB and 26-28 wk. following TA treatment. Initially DAB and TA markedly decreased the activity of catalase. Then the activity increased, but remained lower than in controls throughout the whole period of carcinogenesis. Throughout the process of carcinogenesis, the activity of succinic dehydrogenase (SDH) was lower than in controls, and was lowest during the first 2 wk. of treatment with DAB and TA,

as well as during the period when the tumors appeared in the liver. Initially DAB and TA caused a decrease of riboflavin in liver which later increased gradually and reached a level equivalent to that of controls at the time of tumor appearance. Flavine adenine dinucleotide level was decreased during the whole treatment, and the amount of free riboflavin and flavine mononucleotide was increased in relation to total content of riboflavin in the liver. No such changes were observed following TZ, which showed no carcinogenic properties. (See also CRA 1(5):#850, 1963; and *ibid.*, 3(2):#266, 1965; and the following abstract.)

65-1816 INDUCTION OF LIVER TUMORS IN RATS BY THIOACETAMIDE. (Uk.) Bykorez, A. I. (Ukrainian Sci. Res. Inst. Exp. Clin. Oncol., Kiev, USSR) and B. L. Rubenchik. Dop. Akad. Nauk URSR (Kiev) (2):257-260, 1964.

White, male rats (total 60; 150-200 g) fed with thioacetamide (0.032%) were sacrificed at certain time intervals and the changes in the liver determined. In 5/6 rats, observed during the entire period, liver cirrhous adenocarcinomas were already noted after 20 wks. Malignant change was noted about 16 wk. after the start of treatment. Of 32 rats, which survived >16 wk., 29 showed malignant neoplasms. Morphological changes in liver are discussed in detail. (See also CRA 3(6):#1410 and the preceding abstract.)

65-1817 HAPTENES WHICH DEVELOP IN THE LIVER IN EARLY STAGES OF O-AAT ACTION. (Rus.) Korosteleva, T. A. (Inst. Oncol., USSR Acad. Med. Sci., Leningrad). Vop. Onkol. 11(2):67-73, 1965.

Liver tissue extracts of male C3HA mice fed o-amino-azotoluene (OAA; 0.1 ml of a 1% soln. in oil or 2 mg/day x 4) contained 1.5%-2% protein. When the proteins were studied by precipitation reactions with hyperimmune sera of rabbits immunized with various antigens, the OAA-treated mice showed antigens which were absent in controls. These hap-tene-containing antigens included soluble liver cell proteins combined with a structural analog of the carcinogen. The problem of haptens developing during the early stages of OAA-induced carcinogenesis in liver is discussed in connection with their significance in the process of cell maligni-zation. (See also CRA 3(6):#1380, 1965.)

65-1818 THE EFFECT OF URETHAN AND 7,12-DIMETHYL-BENZ[a]ANTHRACENE ON ORGAN CULTURES OF NEWBORN AND ADULT MOUSE THYMUSES. (E.) Tomatis, L. (Dept. Oncol., Chicago Sch. Med., Ill.) and L. Wang. Tumori 50(5):361-373, 1964.

Thymuses from adult (8-9 wk. old) and newborn random-bred Swiss albino and inbred MA mice

maintained *in vitro* as organ cultures were incub. for 24 hr. with urethan (U; 3.3%) or 7,12-dimethylbenz(a)anthracene (DMBA; 25 µg/ml). Histological examinations were performed, at intervals from 2 to 20 days. Necrosis of the peripheral zone of the cortex became visible 24 hr. after exposure to either carcinogen. In adult and newborn thymuses treated with DMBA, the necrosis was progressive and involved a large part of the organ. Similar, but less intense progressive necrosis occurred in newborn thymuses treated with U. Adult thymuses treated with U showed increasing necrosis for 2-3 days which then subsided, the organs becoming similar to untreated controls by day 20. Both carcinogens inhibited the peripheral growth of fibroblasts and epithelial cells, but this effect was more pronounced with DMBA.

65-1819 OCCUPATIONAL BLADDER TUMOURS AND THE CONTROL OF CARCINOGENS. (E.) Lancet 1:306-307, 1965.

The need for rules and regulations relative to carcinogens which cause occupational bladder tumors in the rubber and related industries is discussed. A 43-year-old man who died from an occupational bladder carcinoma was discussed (see the following abstract).

65-1820 INDUSTRIAL CANCER OF THE BLADDER. (E.) Lancet 1:328, 1965.

A case history is presented of a 43-year-old man with advanced bladder carcinoma who 14 yr. previously had worked in a cable factory and was exposed to β-naphthylamine and other substances for 15 yr. In the same factory, 6 other workers have also developed bladder tumors. It was noted that if cytological examination had been available to the man, the tumor may have been cured.

65-1821 OBSERVATIONS ON THE CHRONIC TOXICITY OF 3-PHENYL-5β-DIETHYLAMINOETHYL-1,2,4-OXADIAZOLE IN THE RAT AND DOG. (E.) Barron, C. N. (Smith Kline and French Lab., Philadelphia, Pa.). Exp. Molec. Path. (Suppl. 2): 1-27, 1963.

Observations are presented of 3 experiments in which 3-phenyl-5β-diethylaminoethyl-1,2,4-oxadiazole (PDO) was admin. p.o. to rats and dogs at different dose levels for periods of 45 days to 1 yr. Daily dosage (mg/kg) in rats ranged from 59-900; that for dogs, 15-250. Significant morphologic findings were restricted to the urinary bladder, were dose related, and were characterized by degenerative, regenerative, and hyperplastic changes in the vesical mucosa, progressing through precancerous proliferation and culminating ultimately in carcinomas derived from transitional epithelium. It is concluded that the p.o. admin. of PDO as the citrate salt has a

carcinogenic effect on the transitional epithelium of the urinary bladder of the rat and probably of the dog. (See also the following 3 abstracts.)

65-1822 TOXICOLOGIC STUDIES ON 1,2,4-OXADIAZOLE DERIVATIVES: RELATIONSHIP BETWEEN CHEMICAL STRUCTURE AND BLADDER IRRITATION. (E.) Catanese, B. (Res. Lab., A.C.R.A.F., Rome, Italy), C. Palazzo, C. Pozzatti and B. Silvestrini. Exp. Molec. Path. (Suppl. 2):28-40, 1963.

Acute and chronic inflammatory bladder irritative effects provoked by 1,2,4-oxadiazole derivatives were studied in Long Evans rats (1600; both sexes; wt. 80-350 g), CFN albino rats (180) and 24 dogs. Rats treated with 3-phenyl-5β-diethylaminoethyl-1,2,4-oxadiazole (PDO; 500 mg/kg p.o.) showed bladder irritation 12-24 hr. after admin. In general, the oxadiazole derivatives that irritate the bladder are characterized by the presence of an aminoethyl chain (in position 5) in which N is linked to 2 alkyl radicals or is part of a morpholine or pyrrolidine group. The urine collected from rats treated with PDO contained diethylamine. Vesical irritation was related not only to the formation of secondary amines, but also to the rate at which this process took place. (See also CRA 3(7):#1823 and #1824, 1965.)

65-1823 TOXICITY STUDIES ON 3-PHENYL-5β-DIETHYLAMINOETHYL-1,2,4-OXADIAZOLE: VESICAL IRRITATING ACTIVITY OF DIETHYLAMINE AND OTHER SIMPLE AMINES. (E.) Silvestrini, B. (Res. Lab., A.C.R.A.F., Rome, Italy), B. Catanese, A. Garau and C. Pozzatti. Exp. Molec. Path. (Suppl. 2): 41-49, 1963.

Diethylamine (D) inj. s.c. dorsally into rats produced a local irritating effect of edema and reddening even with dilutions of 0.025%. Bladder irritation (BI) occurred in rats and mice when 10 mg/kg of D was inj. i.v. Oral admin. of D (300-500 mg/kg) induced a mild BI. BI was also obtained in mongrel dogs treated i.v. with D (5 mg/kg/day x 5) and after i.v. or s.c. inj. of other simple amines. The HCl salt of D was not as irritative as the base itself. The irritative activity of urine (assayed s.c. in rats) from a dog treated with 3-phenyl-5β-diethylaminoethyl-1,2,4-oxadiazole (PDO; 200 mg/kg p.o.) or from rats treated with PDO (1000 mg/kg p.o.) confirmed that the irritative fraction was D. (See also CRA 3(7):#1822 and #1824, 1965.)

65-1824 TOXICITY STUDIES OF 3-PHENYL-5β-DIETHYLAMINOETHYL-1,2,4-OXADIAZOLE ON MICE, RATS, AND DOGS. (E.) Silvestrini, B. (Res. Lab., A.C.R.A.F., Rome, Italy), B. Bignami, A. Garau and C. Pozzatti. Exp. Molec. Path. (Suppl. 2): 50-64, 1963.

When 3-phenyl-5β-diethylaminoethyl-1,2,4-oxadiazole was admin. (i.v., i.p. and p.o.; 30 to about 1000

mg/kg for 1-450 days) to CFI mice, Long Evans and CFN rats, and mongrel dogs, the animals tended to develop an inflammatory response in the urinary bladder. This effect was reversible, even after 1 yr. of treatment with high doses. Other toxic effects were negligible. (See also CRA 3(7): #1822 and #1823, 1965.)

65-1825 THE CONTENTS OF TRICHLOROACETIC ACID-SOLUBLE SULPHYDRYL COMPOUNDS AND ASCORBIC ACID IN THE LIVER OF RATS FED AMINOAZO DYES: THE EFFECT OF A SINGLE LARGE DOSE OF DYE. (E.) Dijkstra, J. (Nat. Chem. Res. Lab., Pretoria, S. Africa). Brit. J. Cancer 18(3):608-617, 1964.

In male albino rats, a single intragastric dose (50 mg) of aminoazo dyes (4-dimethylaminoazobenzene (DAB), 3'-methyl-DAB (3'-MeDAB), 2-methyl-DAB (2-MeDAB) and aminoazobenzene (AB)) caused a fall of the TCA-soluble sulphydryl conc. in the liver to a minimum after about 4 hr. The subsequent increase followed the same time course as the binding of azo dye to liver protein, which was max. after 40-50 hr. and was of the same magnitude for both carcinogenic and noncarcinogenic dyes. After 40 hr. the level decreased, returning to normal after about 4 days. The ascorbic acid content of the liver of rats treated with 3'-MeDAB or 2-MeDAB decreased at approx. 40 hr. to 60% of its normal value and recovery to a normal level was not complete within 2 wk. (See also the following abstract.)

65-1826 THE CONTENTS OF TRICHLOROACETIC ACID-SOLUBLE SULPHYDRYL COMPOUNDS AND ASCORBIC ACID IN THE LIVER OF RATS FED AMINOAZO DYES: THE EFFECT OF CONTINUOUS FEEDING OF DYES IN THE DIET. (E.) Dijkstra, J. (Nat. Chem. Res. Lab., Pretoria, S. Africa) and W. J. Pepler. Brit. J. Cancer 18(3):618-625, 1964.

In male rats (150-170 g wt.) the feeding ad lib. of diets containing 2.66 mmoles of aminoazo dyes (aminoazobenzene (AB), 4-dimethylaminoazobenzene (DAB), 2-methyl-DAB (2-MeDAB) or of 3'-MeDAB) caused a rise in TCA-soluble sulphydryl compounds in the liver. During the first 7 wk. this increase was not characteristic for the carcinogenic process, but between 10-20 the SH level was higher after DAB and 3'-MeDAB than after AB or 2-MeDAB. The SH level was high in aminoazo dye-induced hepatocellular carcinoma and its surrounding tissue, but was low in a cholangio carcinoma. The ascorbic acid content of liver was more or less increased (compared with that of controls) but no changes were observed which were characteristic for the carcinogenic process. The ascorbic acid content was low in tumors and their surrounding tissue. (See also the preceding abstract.)

65-1827 STUDIES OF THE PROLONGED BIOCHEMICAL EFFECTS OF 3-METHYLCHOLANTHRENE AND OF

ITS PHYSIOLOGICAL DISPOSITION IN THE RAT. (E.) Dayton, P. G. (New York U. Res. Serv., N. Y.), P. Vrindten and J. M. Perel. Biochem. Pharmacol. 13(2):143-152, 1964.

Male Wistar rats (180-340 g) inj. with 20-methylcholanthrene (MC), i.p. or s.c., showed increased ascorbic acid excretion and enhanced xoxazolamine hydroxylase activity for at least 7 wk. In contrast to barbitol (B), both Chloretone (C) and MC only slightly increased the free D-glucuronic acid excretion; B, C, and MC markedly stimulated L-ascorbic acid excretion. In the initial 24-hr. period (after admin.), MC had no appreciable effect on ascorbic acid excretion (whereas C caused a marked increase) and led to a marked increase of xoxazolamine hydroxylase activity (whereas C caused a moderate rise of the enzyme). Eventually, both effects paralleled each other, but the fact that their onset was not simultaneous suggests that there may be no interrelation between these two biochemical responses. (See also CRA 3(7):#1704 and #1705, 1965.)

65-1828 CHROMOSOMES OF 3'-Me-DAB-INDUCED RAT HEPATOMA. (Jap., Abstract) Makino, S. (Dept. Zoology, Hokkaido U., Japan) and T. Honda. Idengaku Zasshi (Jap. J. Genet.) 38(3):192-193, 1963.

Compared to normal liver tissue, 3'-Me-DAB-induced rat hepatoma showed significant deviations in chromosome number but no significant variations in chromosome morphology. In contrast, MTK sarcoma-III showed extremely complex morphologic abnormalities.

65-1829 AN AUTOPSY CASE OF ACUTE LEUKEMIA WITH MYELOFIBROSIS AFTER LONG-TERM EXPOSURE TO BENZENE. (Jap.) Mikami, M. (Dept. Intern. Med., Tokyo Women's Coll. Med.), C. Koyama, N. Araki, T. Okubo and M. Hashimoto. Tokyo Joshi Ika Daigaku Zasshi (J. Tokyo Women's Med. Coll.) 33(10):529-535, 1963.

The patient (age 52 at autopsy) initially developed aplastic anemia after 1 yr. exposure to benzene. This was followed by the development of myelofibrosis and further acute aleukemic myeloid leukemia after additional exposure for about 4 yr. Histopathological studies at autopsy supported the exposure to benzene as a causative factor in the development of the leukemia.

65-1830 EXPERIMENTAL STUDIES ON THE ETIOLOGY OF CANCER TYPES SPECIFIC TO INDIA. A. ORAL CANCER; B. KANGRI CANCER. (E.) Ranadive, K. J. (Dept. Appl. Biol., Indian Cancer Res. Ctr., Bombay), S. V. Gothoskar and V. R. Khanolkar. Acta Un. Int. Cancr. 19:634-639, 1963.

Inbred Swiss or hybrid (Paris albino XVII x C57 Black) mice were admin. extracts (E8 = total

tobacco extract; Eg = extract partially free of alkaloids; E₁₀ = totally free of alkaloids) of Vaddakan tobacco (Meenampalayam variety) by multiple s.c. inj. (0.1 ml of 2% soln. 1x/mo. for 41-95 wk.) or by cutaneous applications (2x/wk.) on the interscapular region which were followed by a weekly painting of croton-oil (C0). In 17 hybrid animals, Eg inj. produced 1 squamous epidermoid carcinoma, while no tumors occurred in 17 hybrids treated with E₁₀ inj. The av. latent period of papillomas, the number of gross papillomas and the number of frank carcinomas (epidermoid or basal cell) produced in the hybrids by the following skin painting were as follows: Eg, Eg and C0, 59.5 wk., 10 (47.6%), and 6 (28.6%); Eg and C0, 82.7 wk., 9 (43%) and 2 (8%); E₁₀ and C0, 58.1 wk., 22 (63%) and 10 (28.6%); controls (acetone + C0), 74.3 wk., 3 (15.8%) and 0. In the Swiss mice, no frank carcinomas occurred and the equivalent groups as above showed 2-3 papillomas (22.2%-50%) after 46.6-57 wk. It was concluded that the tobacco extracts have a weak carcinogenic effect demonstrable with the aid of a cocarcinogen (C0) on hybrid mouse skin. A single painting of 3,4-benzpyrene (BP; micro-dose, no other details), followed by bi-weekly paintings of E₁₀ (1-80 wk.), produced 2 frank carcinomas and 1 doubtful malignant papilloma in 13 Swiss (Baldy) mice and 1 doubtful malignant papilloma in 16 Swiss mice; none of the controls treated only with BP developed tumors. Biweekly paintings with chinar tar (10%) in benzene and C0 (3%) on the skin of Swiss mice produced 2 epidermoid carcinomas, 11 papillomas, and 1 papilloma of doubtful malignancy in 12 females; 8/19 males developed 8 papillomas only.

- 65-1831 SOME ASPECTS OF THE DEVELOPMENT, BIOLOGY AND BIOCHEMISTRY OF RAT HEPATOMAS OF DIFFERENT GROWTH RATE. (E.) Morris, H. P. (NCI, Bethesda), H. M. Dyer, B. P. Wagner, H. Miyaji and M. Rechcigl, Jr. Pp. 321-333 in *Advances in Enzyme Regulation*. II. Proc. 2nd Symp. Regulat. Enzyme Activity-Synthesis Norm. Neoplast. Liver; Indiana U. Sch. Med., Indianapolis; Sept. 30-Oct. 1, 1963. Weber, G. (Ed.). Pergamon Press, Oxford, 1964, 405 pp.

Transplantable "minimal deviation" type hepatomas were induced in male and female Buffalo and ACI/N strain rats by the ingestion of a diet containing 0.042% of N-2-fluorenylphthalamic acid (2-FPA) for approx. 10 mo. Tryptophan pyrrolase (TP) activity with and without the i.p. admin. of L-tryptophan (LT) was examined in the homogenates of livers of intact tumor-bearing rats and 14 hepatomas and is presented in detail. The effect of ethionine inj. on lipid content of liver and tumor, and the catalase activities found in a series of transplantable hepatomas are also presented in detail. Wide variations in the enzyme activities were found even when the original tumors were induced by the same chemical and under as similar experimental conditions as possible.

- 65-1832 CHEMICAL INDUCTION OF NEOPLASMS IN THE KIDNEY OF *RANA PIPIENS*. (E.) Strauss, E. (Dept. Biol., New York U., Grad. Sch. Arts Sciences, N. Y.) and G. M. Mateyko. *Cancer Res.* 24(11):1969-1977, 1964.

A more detailed account of the paper abstracted as CRA 1(5):#836, 1963.

- 65-1833 THE EFFECT OF GLYCEROL ADDED TO TOBACCO ON THE CONSTITUENTS OF CIGARETTE SMOKE. (E.) De Souza, J. E. (Imperial Tobacco Co. Canada Ltd., Montreal) and M. Scherbak. *Analyst* 89:735-739, 1964.

No major differences could be found in the amounts of 3,4-benzpyrene, whole tar, or nicotine in the mainstream of smoke from tobacco without or with added glycerol (3.3% or 6.1% wt./wt.).

- 65-1834 IMMUNITY TO SPONTANEOUS AND METHYL-CHOLANTHRENE-INDUCED TUMORS IN INBRED MICE. (E.) Riggins, R. S. (NCI, Bethesda) and Y. H. Pilch. *Cancer Res.* 24(11):1994-1996, 1964.

A spontaneously arising mammary adenocarcinoma (AC) was inoc. into the thigh of 107 female C3H/HEN mice 6 wk. old. The tumor-bearing extremities were amputated 16 days later, and 115 tumor-free mice also underwent similar amputation. Seven days after amputation, 50% of each group was challenged with 1000 viable tumor cells from the first transplant of the AC, and the remaining 50% of each group was inoc. with 1000 viable cells from the third transplant generation of a methyl-cholanthrene-induced fibrosarcoma (FS). A similar experiment with FS-immunized mice and nonimmunized amputated controls was carried out, except that since this tumor grows more rapidly, amputation was performed on day 7 and challenge 14 days later. The specific immunity which was produced by AC was less than that produced by FS. There was no cross-immunity between the tumors. In addition, some animals immunized with FS and challenged with FS 20 hr. after amputation, or without amputation, showed no resistance to the challenging inoc.

- 65-1835 STORAGE AND ACCUMULATION OF 3,4-BENZ-PYRENE IN THE LUNGS OF MICE. (Cz.) Ploc, S. (Dept. Public Health, Charles U. Sch. Hyg., Prague, Czech.). *Cesk. Hyg.* 8:328-332, 1963.

Parenteral admin. of 3,4-benzpyrene (BP; 0.5 mg) resulted within 1 min. in 16% uptake by the lungs; 2% and 0.5% of the dose still remained in the lungs after 10 and 20 days, resp. With constant doses, accumulation of BP increased as the number of applications increased and as the interval between applications was shortened.

- 65-1836 OCCURRENCE OF 3,4-BENZPYRENE IN THE ATMOSPHERE OF THE CITY OF MOST AND IN

THE COAL MINES OF THE MOST DISTRICT. (Cz.)

Bufka, J. Cesk. Hyg. 8:340-343, 1963.

In the air of the city of Most, the conc. of 3,4-benzpyrene generally ranged from 2.51-25.60 $\mu\text{g}/100\text{ m}^3$, and in one air sample where there was a heavy conc. of smoke it reached 222.00 $\mu\text{g}/100\text{ m}^3$. In general, the values corresponded to the extent of smog and fluctuated locally with the winds. In local coal mines, the conc. ranged from 2.84 to 38.83 $\mu\text{g}/100\text{ m}^3$ of air. Mine fires in waste fields were considered to contribute to these high conc. of 3,4-benzpyrene.

65-1837 CARCINOGENIC HYDROCARBONS FROM EXHAUST FUMES IN THE WORKING ATMOSPHERE. (Cz.)

Zdražil, J. and F. Pícha. Cesk. Hyg. 8:344-348, 1963.

Conc. of 3,4-benzpyrene found in the air under working conditions was 0.468-0.746 $\mu\text{g}/\text{m}^3$ in shops manufacturing diesel engines (8.21 $\mu\text{g}/\text{m}^3$ at the orifices of exhausts), 0.520-0.643 $\mu\text{g}/\text{m}^3$ in shops repairing diesel engines, and 0.205 $\mu\text{g}/\text{m}^3$ in garages. The use of transport vehicles with combustion engines in closed halls resulted in a conc. of 0.142 $\mu\text{g}/\text{m}^3$ of air. (See also CRA 1(3):#550, 1963; *ibid.*, 3(3):#594, 1965.)

65-1838 CONCENTRATION OF 3,4-BENZPYRENE AND ARSENIC COMPOUNDS IN THE ATMOSPHERE OF PRAGUE. (Cz.) Vondráček, V. (12 Rytířská, Prague 1, Czech.). Cesk. Hyg. 8:333-339, 1963.

A brief review (6 references) of statistics on world mortality due to lung cancer is followed by measurements of air pollution in Prague. The conc. of 3,4-benzpyrene in May to June was 0.5-2.5 $\mu\text{g}/100\text{ m}^3$. Sediment specimens from various areas of the city showed 1156-2260.0 μg of As_2O_3 per 10 grams of sediment. The heating fuel contains 0.001%-0.023% of As. A definite correlation was found between the fuel consumption in winter mo. and high As_2O_3 content in the air (which av. 55.94 $\mu\text{g}/100\text{ m}^3$ in the winter season, with peaks of 138 and 136 $\mu\text{g}/100\text{ m}^3$; only 7.34 $\mu\text{g}/100\text{ m}^3$ in the warm season; av. 30.45 $\mu\text{g}/100\text{ m}^3$ for the yr.). No correlation has been shown to exist in regard to increased automobile traffic in the center of the city.

65-1839 ACHIEVEMENT OF AN EXPERIMENTAL MODEL OF LEUKEMIA IN MICE. (Rus.) Semenskaia, E. M., T. I. Abakeliia, N. G. Larionova and E. S. Kiguradze. Tr. Inst. Eksp. Klin. Khir. Gemat., Akad. Nauk Gruz. SSR (Tbilisi) 11:151-154, 1963.

Following s.c. admin. of 9,10-dimethyl-1,2-benzanthracene (1 ml of a 1% soln. in benzene) 19/30 mice (Strain Afb) died of toxicity within 15-30 days; no tumor formation or changes in peripheral blood were evident. The remaining 11 developed leukemia within 3-3.5 mo.; 2/11 also developed a

tumor at the site of inj. and 2/11 developed tumors in the abdominal cavity. (See also CRA 1(4):#646, 1963.)

65-1840 BARBECUING AND HEALTH HAZARDS. (E.)

White, P. L. J.A.M.A. 190(11):1019, 1964.

In response to a question relating to the possibility of producing toxic compounds by using newspapers as fuel for broiling food, the author suggests that such broiling be carried out in a manner which avoids the ignition of fat drippings as much as possible because of the possible production of carcinogens and mentions that the Food and Drug Administration recommends that newspapers not be used as fuel for broiling.

65-1841 REACTION OF THE CARCINOGEN DIMETHYL-NITROSAMINE WITH PROTEINS AND WITH THIOL COMPOUNDS IN THE INTACT ANIMAL. (E.) Craddock, V. M. (Toxicol. Res. Unit, Med. Res. Council, Carshalton, Surrey, England). Biochem. J. 94(2):323-330, 1965.

A more detailed account of the paper abstracted as CRA 2(4):#701, 1964. (See also CRA 1(12):#2084, 1964.)

65-1842 PHENYLBUTAZONE AND LEUKAEMIA. (E.)

Woodliff, H. J. (Royal Perth Hosp., Western Australia) and L. Dougan. Brit. Med. J. 1:318, 1965.

Further discussion is presented of the association of phenylbutazone and leukemia presented in CRA 2(5):#873, 1964.

65-1843 MORPHOLOGICAL CHARACTERISTICS OF TUMORS INDUCED IN GROUND SQUIRRELS (SUSLIK).

(Georgian, Rus. Summary) Sharashidze, L. K. and R. V. Bulusashvili. Tr. Inst. Eksp. Klin. Khir. Gemat., Akad. Nauk Gruz. SSR (Tbilisi) 11:121-123, 1963.

Of 16 ground squirrels (suslik) none developed skin cancer following topical application of 9,10-dimethyl-1,2-benzanthracene (DMBA). However, one of the six squirrels treated by s.c. admin. of DMBA developed a polymorphocellular sarcoma 9 mo. later.

65-1844 STUDY OF HISTOCHEMICAL CHANGES OF DERMAL FIBROUS STRUCTURE IN THE PROCESS OF

CHEMICAL CARCINOGENESIS. (Georgian, Rus. Summary) Sharashidze, L. K., R. V. Bulusashvili and R. M. Kochakidze. Tr. Inst. Eksp. Klin. Khir. Gemat., Akad. Nauk Gruz. SSR (Tbilisi) 11:103-110, 1963.

Albino Strain A mice showed definite histochemical changes in the connective tissue of the skin

following topical application of 9,10-dimethyl-1,2-benzanthracene. These changes, which became more intense with increase in the number of applications, ultimately led to a marked disturbance of the process of collagen formation and disappearance of the elastic fibers. It is possible that the changes observed in the connective tissue are factors which promote infiltrative growth of tumor cells.

- 65-1845 LACTIC DEHYDROGENASE ISOZYMES DURING DEVELOPMENT OF AZO DYE TUMORS. (E.) Kline, E. S. (Dept. Biochem., Virginia Sch. Med. Richmond) and C. C. Clayton. Proc. Soc. Exp. Biol. Med. 117(3):891-894, 1964.
- 65-1846 RESPONSE OF LIVER NUCLEIC ACIDS AND LIPIDS IN RATS FED CYCAS CIRCINALIS L. ENDOSPERM OR CYCASIN. (E.) Williams, J. N., Jr. (NIH, Bethesda) and G. L. Laqueur. Proc. Soc. Exp. Biol. Med. 118(1):1-4, 1965.
- 65-1847 AFLATOXIN-INDUCED HEPATIC FIBROSIS IN RHESUS MONKEYS. PATHOLOGICAL FEATURES. (E.) Madhavan, T. V. (Nutrition Res. Lab., Hyderabad-7, India), P. G. Tulpule and C. Gopalan. Arch. Path. (Chicago) 79(5):466-469, 1965.
- 65-1848 BETEL CHEWING AND LEUKOPLAKIA. (Ger.) Forlen, H. P. (Dept. Derm., Med. Acad., Dusseldorf, Germany), O. Hornstein and G. Stüttgen. Arch. Klin. Exp. Derm. 221(5):463-480, 1965.
- 65-1849 IMMUNOLOGICAL PROPERTIES OF CHEMICALLY INDUCED SARCOMAS. (E.) Feldman, M. (Dept. Cell Biol., Weizmann Inst. Sci., Rehovoth, Israel), A. Globerson and D. Yaffe. Philipp. J. Cancer 5(3):562-574, 1963.
- 65-1850 THE EFFECT OF ENHANCEMENT OF NATURAL RESISTANCE UPON TUMOR REJECTION. (E.) Benacerraf, B. (Dept. Path., New York U. Sch. Med., N. Y.). Philipp. J. Cancer 5(4):615-621, 1963.
- 65-1851 THE HORMONAL STIMULATION AND REACTIVITY OF THE MAMMARY GLAND EPITHELIUM IN MICE WITH HIGH AND LOW TUMOR INCIDENCE. (E.) Laguchev, S. S. (Inst. Exp. Biol., USSR Acad. Med. Sci., Moscow). Acta Un. Int. Cancr. 20(6-7):1468-1469, 1964.
- 65-1852 THE IDENTIFICATION OF NITRO-OLEFINS IN THE COMBUSTION PRODUCTS OF HYDROCARBONS. II. (E., Abstract) Lampe, K. F. (Dept. Pharm., U. Miami Sch. Med., Coral Gables, Fla.) and W. B. Deichmann. Industr. Med. Surg. 34(2):151, 1965.
- 65-1853 OBSERVATIONS ON THE ZINC INDUCED TESTICULAR TERATOMAS OF FOWL. (E.) Guthrie, J. (Dept. Path., St. Mary's Hosp., London W.2). Brit. J. Cancer 18(1):130-142, 1964.
- 65-1854 THE PRODUCTION OF MALIGNANT TUMOURS BY CADMIUM IN THE RAT. (E.) Heath, J. C. (Strangeways Res. Lab., Cambridge) and M. R. Daniel. Brit. J. Cancer 18(1):124-129, 1964.
- 65-1855 AZO-DYE CARCINOGENESIS: RIBONUCLEIC ACID AND OTHER CONSTITUENTS OF CYTOPLASMIC PARTICLES. (E.) Reid, E. (Chester Beatt Res. Inst., London, S.W.3). Brit. J. Cancer 18(1):172-178, 1964.
- 65-1856 AZO-DYE CARCINOGENESIS: ENZYMES CONCERNED IN URIDINE NUCLEOTIDE METABOLISM. (E.) Reid, E. (Chester Beatty Res. Inst., London S.W.3). Brit. J. Cancer 18(1):179-196, 1964.
- 65-1857 ZINC AND COPPER CONTENT OF SOILS ASSOCIATED WITH THE INCIDENCE OF CANCER OF THE STOMACH AND OTHER ORGANS. (E.) Stocks, P. (Dept. Biochem., University Coll. North Wales Sch. Agric., Bangor) and R. I. Davies. Brit. J. Cancer 18(1):14-24, 1964.
- 65-1858 DIFFERENTIAL TOXICITY RESPONSE OF NORMAL AND NEOPLASTIC CELLS IN VITRO TO 3,4-BENZOPYRENE AND 3-METHYLCHOLANTHRENE. (E.) Alfred, L. J. (Dept. Cell Biol., Weizmann Inst. Sci., Rehovoth, Israel), A. Globerson, Y. Berwald and R. T. Prehn. Brit. J. Cancer 18(1):159-164, 1964.
- 65-1859 ON THE ACTIVE SUBSTANCE OF CROTON OIL. II. A SYSTEMATIC FRACTIONATION OF CROTON OIL. (Ger.) Hecker, E. (Max Planck Inst. Biochem., Munich, Germany), H. Jarczyk, J. G. Meyer, H. Bresch and I. Brachmann. Zschr. Krebsforsch. 66(5):478-490, 1965.
- 65-1860 STEROIDS, MORPHOGENESIS AND CANCER. (It.) Burzatta, G. Gazz. Sanit. 35(10-11):525-529, 1964.
- A review.
- 65-1861 FREE RADICAL REACTION OF 4-NITROQUINOLINE 1-OXIDE. (Jap.) Kosuge, T. (Shizuoka U. Coll. Pharm., Japan), K. Adachi, M. Yokota and T. Nakao. Yakugaku Zasshi (J. Pharm. Soc. Jap.) 85(1):66-69, 1965.
- 65-1862 FORMATION OF 4-NITROSOQUINOLINE-1-OXIDE AND SYNTHESIS OF 4-PHENYLAZOQUINOLINE

- 1-OXIDE. (Jap.) Kosuge, T. (Shizuoka U. Coll. Pharm., Japan) and M. Yokota. Yakugaku Zasshi (J. Pharm. Soc. Jap.) 85(1):69-71, 1965.
- 65-1863 A REMARK ON THE ULTRAVIOLET SPECTRUM OF CHRYSENE. (E.) Sauvageau, P. (Dept. Chem., U. Montreal, Canada) and C. Sandorfy. Canad. J. Chem. 42(1):197-200, 1964.
- 65-1864 CARCINOGENESIS OF MAMMARY GLAND IN RAT. (E.) Dao, T. L. (Roswell Park Mem. Inst., Buffalo, N. Y.). Progr. Exp. Tumor Res. 5:157-216, 1964.
- 65-1865 SOLUBLE NUCLEAR PROTEINS OF LIVER AND TUMOR IN AZO DYE CARCINOGENESIS. (E.) Bakay, B. (Inst. Cancer Res., Philadelphia, Pa.) and S. Sorof. Cancer Res. 24(10):1814-1825, 1964.
- 65-1866 HORMONAL INFLUENCES ON URETHAN CARCINOGENESIS IN C3H/f MICE. (E.) Liebelt, R. A. (Dept. Anat., Baylor U. Coll. Med., Houston, Tex.), A. G. Liebelt and M. Lane. Cancer Res. 24(11):1869-1879, 1964.
- 65-1867 CELLULAR POPULATIONS AND MITOTIC ACTIVITY IN RAT LIVER PARENCHYMA DURING AZO DYE CARCINOGENESIS. (E.) Daoust, R. (Dept. Res., Cancer Inst. Montreal, Canada) and F. Molnar. Cancer Res. 24(11):1898-1909, 1964.
- 65-1868 SIGNIFICANCE OF THYMUS AND MARROW INJURY IN URETHAN LEUKEMOGENESIS. (E.) Haran-Ghera, N. (Dept. Radiol., Stanford U. Sch. Med., Palo Alto, Cal.) and H. S. Kaplan. Cancer Res. 24(11):1926-1931, 1964.
- 65-1869 CARCINOGENESIS STUDY WITH DIMETHYL-NITROSAMINE ADMINISTERED ORALLY TO ADULT AND SUBCUTANEOUSLY TO NEWBORN BALB/c MICE. (E.) Toth, B. (Chicago Sch. Med., Inst. Med. Res., Ill.), P. N. Magee and P. Shubik. Cancer Res. 24(10):1712-1721, 1964.
- 65-1870 THE EFFECTS OF ADRENALECTOMY, HYPOPHYSECTOMY, AND CASTRATION ON THE URINARY METABOLITES OF 2-ACETYLAMINOFLUORENE IN THE RAT. (E.) Lotlikar, P. D. (McArdle Mem. Lab. Cancer Res., U. Wisconsin Sch. Med., Madison), M. Enomoto, E. C. Miller and J. A. Miller. Cancer Res. 24(4):1835-1844, 1964.
- 65-1871 PROTEIN BINDING DURING MOUSE SKIN CARCINOGENESIS BY 9,10-DIMETHYL-1,2-BENZANTHRACENE. THE EFFECT OF COPPER ACETATE AND THE NON-RANDOM DISTRIBUTION OF INDUCTION TIMES AMONG MICE GIVEN IDENTICAL TREATMENT. (E.) Fare, G. (Dept. Path., U. Birmingham Sch. Med., England). Brit. J. Cancer 18(4):768-776, 1964.
- 65-1872 FAILURE OF COPPER TO INHIBIT CARCINOGENESIS BY 2-AMINOFLUORENE. (E.) Goodall, C. M. (Dept. Oncol., Chicago Sch. Med., Ill.). Brit. J. Cancer 18(4):777-781, 1964.
- 65-1873 THE PROTECTIVE EFFECTS OF BEEF AND YEAST EXTRACTS AND COPPER ACETATE IN THE DIET AGAINST RAT LIVER CARCINOGENESIS BY 4-DIMETHYLAMINOAZOBENZENE. (E.) Fare, G. (Dept. Path., U. Birmingham Sch. Med., England). Brit. J. Cancer 18(4):782-791, 1964.
- 65-1874 EFFECT OF ROUTE OF ADMINISTRATION ON THE CARCINOGENIC ACTION OF DIETHYL-NITROSAMINE (N-NITROSODIETHYLAMINE). (E.) Herrold, K. M. (NCI, Bethesda). Brit. J. Cancer 18(4):763-767, 1964.
- 65-1875 ACUTE TOXICITY OF AFLATOXIN B₁ IN RATS. (E.) Butler, W. H. (Dept. Morbid Anat., U. London Coll. Hosp. Sch. Med.). Brit. J. Cancer 18(4):756-762, 1964.
- 65-1876 CADMIUM NEOPLASIA: SARCOMATA AT THE SITE OF INJECTION OF CADMIUM SULPHATE IN RATS AND MICE. (E.) Haddow, A. (Chester Beatty Res. Inst., London, S.W.3), F. J. C. Roe, C. E. Dukes and B. C. V. Mitchley. Brit. J. Cancer 18(4):667-673, 1964.
- 65-1877 CADMIUM NEOPLASIA: TESTICULAR ATROPHY AND LEYDIG CELL HYPERPLASIA AND NEOPLASIA IN RATS AND MICE FOLLOWING THE SUBCUTANEOUS INJECTION OF CADMIUM SALTS. (E.) Roe, F. J. C. (Chester Beatty Res. Inst., London, S.W.3), C. E. Dukes, K. M. Cameron, R. C. B. Pugh and B. C. V. Mitchley. Brit. J. Cancer 18(4):674-681, 1964.
- 65-1878 THE COMPARATIVE CARCINOGENICITIES OF 2-ACETYLAMINOFLUORENE AND ITS N-HYDROXY METABOLITE IN MICE, HAMSTERS, AND GUINEA PIGS. (E.) Miller, E. C. (McArdle Mem. Lab., U. Wisconsin Sch. Med., Madison), J. A. Miller and M. Enomoto. Cancer Res. 24(11):2018-2031, 1964.
- 65-1879 IRON-DEXTRAN CARCINOGENESIS IN RATS: EFFECT OF DISTRIBUTING INJECTED MATERIAL BETWEEN ONE, TWO, FOUR, OR SIX SITES. (E.) Roe, F. J. C. (Chester Beatty Res. Inst., London, S.W.3), A. Haddow, C. E. Dukes and B. C. V. Mitchley. Brit. J. Cancer 18(4):801-808, 1964.
- 65-1880 STUDIES ON NUCLEIC ACIDS DURING CARCINOGENESIS. (E.) O'Sullivan, M. A.

(Chester Beatty Res. Inst., London, S.W.3) and K. S. Kirby. Brit. J. Cancer 18(4):792-800, 1964.

65-1881 ENZYME HISTOCHEMICAL STUDIES OF TRANS-PLANTABLE TUMOURS. (E.) Butschak, G. (Inst. Exp. Cancer Res., German Acad. Sci., Berlin). Acta Un. Int. Cancr. 20(4-5):1068-1070, 1964.

65-1882 HISTOCHEMICAL INVESTIGATION OF SOME ASPECTS OF METABOLISM IN CARCINOGENESIS AND NEOPLASMS. (E.) Raikhlin, N. T. (Dept. Path., Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Acta Un. Int. Cancr. 20(4-5):1071-1073, 1964.

65-1883 ANALYSIS OF THE LIVERS AND TUMORS FOR FOURTEEN TRACE ELEMENTS OF RATS FED 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE (3'-ME-DAB). (E.) Olson, K. B. (Dept. Med., Albany Med. Ctr., N. Y.), C. F. Edwards, G. E. Heggen and A. A. Stein. Acta Un. Int. Cancr. 20(4-5):989-992, 1964.

65-1884 INFLUENCE OF HORMONES ON CARCINOGENESIS OF UTERINE CERVIX OF MICE INDUCED BY METHYLCHOLANTHRENE. (E.) Li, M.-H. (Inst. Exp. Med., Chinese Acad. Med. Sci., Peking) and H.-Y. Ts'ai. Acta Un. Int. Cancr. 20(6-7):1514-1518, 1964.

65-1885 PROTEIN SYNTHESIS AND CATABOLISM IN EXPERIMENTAL LIVER CANCER AND LIVER REGENERATION. (E. and Fr., Abstract) Burke, W. T. (Dept. Biochem., West Virginia U., Morgantown). Acta Un. Int. Cancr. 20(4-5):954, 1964.

65-1886 THE METABOLISM OF CARCINOGENIC AMINES. (E.) Booth, J. (Chester Beatty Res. Inst., London, S.W.3). Acta Un. Int. Cancr. 20(4-5):915-918, 1964.

65-1887 EFFECTS OF SURGICAL TRAUMA AND OTHER ENVIRONMENTAL STRESSORS ON TUMOR GROWTH AND WOUND HEALING. (E.) Gottfried, B. (Waldemar Med. Res. Found., Inc., Woodbury, L.I., N. Y.) and N. Molomut. Acta Un. Int. Cancr. 20(6-7):1617-1620, 1964.

65-1888 DYNAMICS OF MORPHOLOGICAL ALTERATIONS IN THE NERVOUS SYSTEM IN THE COURSE OF INDUCED TUMORS FORMATION. (E.) Klimenko, E. D. (Inst. Norm. Path. Physiol., Acad. Med. Sci., Moscow), L. N. Lebedeva, S. I. Lebedinskaya, E. A. Skvirskaya, A. A. Solovyev and Tchan-Dgin-Dun. Acta Un. Int. Cancr. 20(6-7):1631-1634, 1964.

65-1889 PECULIARITIES OF CANCEROGENESIS IN ANIMALS WITH DIFFERENT INITIAL RESISTANCE TO TUMOR GROWTH. (E.) Tereshchenko, I. P. (P. A. Herzen State Inst. Oncol., Moscow, USSR). Acta Un. Int. Cancr. 20(6-7):1613-1616, 1964.

65-1890 EFFECT OF TRAUMA UNDER CONDITIONS OF HORMONAL DISTURBANCE ON THE FORMATION OF TUMOURS OF THE TESTICLE. (EXPERIMENTAL-MORPHOLOGICAL INVESTIGATION.) (E.) Ganina, K. P. (Panphilovtsev 18, Kiev, USSR). Acta Un. Int. Cancr. 20(6-7):1504-1507, 1964.

65-1891 DEPENDENCE OF THE MALIGNANT NEOPLASM INDUCTION AND GROWTH ON THE THYROID HORMONE. (E.) Voitkevich, A. A. (Dept. Histol., Med. Inst., Voronezh, USSR). Acta Un. Int. Cancr. 20(6-7):1512-1513, 1964.

65-1892 INDUCTION OF TESTICULAR TUMOURS IN RATS BY SUBTOTAL CASTRATION. (E.) Konoplev, V. P. (8-ia Y. Oul Oktiabiskovo Polia, D5, Kv. 23, Moscow). Acta Un. Int. Cancr. 20(6-7):1508, 1964.

65-1893 PROBLEMS OF REACTIVITY OF THE ORGANISM IN MALIGNANT GROWTH. (ON THE MECHANISM OF INFLUENCE OF CORTISONE ON CARCINOGENESIS.) (E.) Gluzman, F. A. (Dept. Path. Physiol., Kiev Inst. Med., USSR). Acta Un. Int. Cancr. 20(6-7):1578-1580, 1964.

65-1894 CANCER AND MESENCHYMAL SYSTEM. (E.) Mizukami, T. (Dept. Surg., Kanazawa U. Sch. Med., Japan). Acta Un. Int. Cancr. 20(6-7):1534-1535, 1964.

65-1895 RESTING POTENTIAL OF MALIGNANT TUMOUR CELLS. (E.) Balitsky, K. P. (Ukrainian Res. Inst. Exp. Clin. Oncol., Kiev, USSR) and E. P. Shuba. Acta Un. Int. Cancr. 20(6-7):1391-1393, 1964.

65-1896 RESISTANCE TO TRANSPLANTED AND SPONTANEOUS ISOLOGOUS TUMORS IN INBRED STRAINS OF MICE. (E.) Cook, E. S. (Divi Thomae Inst., 1842 Madison Rd., Cincinnati, Ohio), L. G. Nutini and J. C. Fardon. Acta Un. Int. Cancr. 20(6-7):1541-1544, 1964.

65-1897 ON THE EXISTENCE OF PREGNANCY-DEPENDENT MAMMARY TUMOURS IN THE RIII/Dm/Se SUB-STRAIN MICE. (E.) Severi, L. (Dept. Cancer Res., U. Perugia, Italy). Acta Un. Int. Cancr. 20(6-7):1450-1452, 1964.

65-1898 THE INFLUENCE OF PSEUDOPREGNANCY, PREGNANCY AND LACTATION ON THE INDUCTION OF

BREAST TUMOURS IN AGENT-FREE MICE BY METHYLCHOL-ANTHRENE (MC). (E.) Marchant, J. (Dept. Path., U. Birmingham, England). Acta Un. Int. Cancr. 20(6-7):1443-1445, 1964.

65-1899 BIOCHEMICAL STUDIES ON SPONTANEOUS CARCINOGENESIS: IN VIVO EFFECTS OF HORMONAL CHANGES ON C3H MICE BEARING HORMONE-DEPENDENT MAMMARY CARCINOMA. (E.) Okita, G. T. (Dept. Pharm., Northwestern U. Sch. Med., Chicago, Ill.) and E. A. Ezz. Acta Un. Int. Cancr. 20(6-7):1463-1467, 1964.

65-1900 ON THE DYNAMICS OF BLASTOMOGENESIS IN THE TESTIS. (E.) Bresler, W. M. (Inst. Cytol., USSR Acad. Sci., Leningrad). Acta Un. Int. Cancr. 20(6-7):1501-1503, 1964.

65-1901 THE ROLE OF PITUITARY HORMONES IN OVARIAN TUMORIGENESIS. (E.) Lipschutz, A. (Inst. Exp. Med., Nat. Health Serv., Santiago, Chile), H. Cerisola and V. I. Panasevich. Acta Un. Int. Cancr. 20(6-7):1412-1416, 1964.

65-1902 THE DEVELOPMENT OF "MINIMAL DEVIATION" HEPATOMAS. (E.) Morris, H. P. (NCI, Bethesda) and B. P. Wagner. Acta Un. Int. Cancr. 20(6-7):1364-1366, 1964.

65-1903 HOST-TUMOR RELATIONSHIPS IN TESTICULAR INTERSTITIAL CELL TUMORS. (E.) Gardner, W. U. (Dept. Anat., Yale U. Sch. Med., New Haven, Conn.). Acta Un. Int. Cancr. 20(6-7):1439-1442, 1964.

65-1904 ROLE OF THE ADRENAL GLANDS IN THE DEVELOPMENT OF LESIONS OF THE LIVER IN RATS INGESTING N-2-FLUORENYLDIACETAMIDE. (E.) Reuber, M. D. (U. Maryland Sch. Med., College Park). J. Nat. Cancer Inst. 34(5):587-594, 1965.

An experimental model with F₁ hybrid rats from male A X C and female Sprague-Dawley rats fed 0.025% N-2-fluorenyldiacetamide in a semisynthetic diet was used to explore the role of the adrenal glands and adrenal hormones in the development of cirrhosis and cancer of the liver. The development of hepatocellular carcinomas or cirrhosis in the intact male rat was not prevented by adrenalectomy alone. In adnex. males, hepatoma formation and cirrhosis were prevented by deoxycorticosterone (DC), 9- α -fluorohydrocortisone (FHC), testosterone, or norethandrolone, and by castration plus cortisone admin. In intact male rats, the only hormone that decreased the incidence of hepatomas was adrenocorticotrophin. There was no change in incidence in intact males receiving DC, FHC, or cortisone; or in either intact or adnex. males given Medrol (6-methyl- Δ -1-hydrocortisone). Cirrhosis was decreased in

intact males given DC, adrenocorticotrophin, or Medrol. Intact or adnex. females given cortisone or FHC, as well as those not given hormones, did not have hepatomas or cirrhosis.

65-1905 TUMOR INCIDENCE IN MICE AFTER ORAL PAINTING WITH CIGARETTE SMOKE CONDENSATE. (E.) Dipaolo, J. A. (NCI, Bethesda) and M. L. Levin. J. Nat. Cancer Inst. 34(5):595-600, 1965.

The effect of oral painting with cigarette tobacco tar on the incidence of pulmonary tumors in Swiss mice was studied. Compared to the control mice, at 18-19 mo. of age the animals treated with whole tar, heptane, and residue fractions had more than double the incidence of pulmonary tumors and over three times the number of other tumors, chiefly of the leukemia-lymphoma group. The pulmonary tumors were predominantly adenomas, but there were a few papillary adenocarcinomas and one anaplastic carcinoma. Although not strictly comparable, the tar concentrations in whole tar, heptane, and residue fractions produced significant increases in the incidence of pulmonary tumors (64.2, 59.3, and 46.5%, resp.), as compared with untreated controls (22.3%).

65-1906 HISTOCHEMICAL STUDIES OF CHOLESTEROL IN THE SUPRARENAL CORTEX OF RATS IN LIVER CANCEROGENESIS INDUCED BY 3-METHYL 4-DI-METHYLAMINOAZOBENZENE. (E.) Hadjiolov, D. (Inst. Cancer Res., Sofia-Darvenitza, Bulgaria). Acta Un. Int. Cancr. 20(6-7):1525-1527, 1964.

65-1907 HORMONES AS PROMOTING AGENTS IN CARCINOGENESIS. (E.) Koprowska, I. (Wistar Inst., Philadelphia, Pa.). Acta Un. Int. Cancr. 20(6-7):1419-1424, 1964.

65-1908 FACTORS INFLUENCING THE PRODUCTION OF RENAL TUMORS IN THE RAT BY DIMETHYLNITROSAMINE. (Fr.) Jasmin, G. (Dept. Path. Anat., U. Montreal, Canada) and J.-L. Riopelle. Rev. Canad. Biol. 23(2):129-134, 1964.

The incidence of bilateral renal tumors (percentage) in albino Wistar, Sprague-Dawley and Fisher rats treated with dimethylnitrosamine (DMN; 0.8 mg/100 g body wt. dissolved in sesame oil and admin. p.o. for 6 days) was 100, 88 and 85, resp. Tumors appeared toward the end of mo. 6. In experiments with 35-90-day-old Sprague-Dawley rats of both sexes treated similarly with DMN, a higher incidence of carcinomas was seen among young males, whereas sarcomatous-type tumors prevailed in females regardless of age. The relationship of these tumors to hormone secretion is discussed.

65-1909 PREVENTIVE EFFECT OF NORANDROSTENOLONE PHENYLPROPIONATE ON EXPERIMENTAL TUMOR FORMATION. (Fr.) Verne, J. (Dept. Histol.,

U. Paris Sch. Med., Sorbonne) and P. C. J. Roth. Bull. Assn. Franc. Cancer 51(2):287-290, 1964.

As a follow-up to CRA 1(7):#1288, 1963, the inj. of higher doses of norandrostenedione phenylpropionate (NP; 1.10-2.0 mg/wk. in sterile olive oil) was also found to have an inhibitory effect on the formation of tumors induced in female C3H mice (R111 mice showed no tumor formation with or without NP admin.) by the s.c. implantation 8-10 days previously of 0.2 mg of dihydrofolilicoline (DHF). Results showed a tumor incidence of 11/68 in C3H mice treated with NP + DHF as compared to 1/8 in animals treated with DHF alone. (See also CRA 2(2):#218, 1964.)

65-1910 COMPARISON BETWEEN BRONCHOPULMONARY CANCER INDUCED IN MICE BY CIGARETTE SMOKE TAR AND HUMAN CANCER. (Fr.) Kourilsky, R. and J.-L. Happert. Bull. Assn. Franc. Cancer 51(2):243-268, 1964.

See CRA 2(5):#860, 1964.

65-1911 EXPERIMENTAL STUDIES ON BERYLLIUM OSTEOMA, ESPECIALLY ON THE METHOD OF PRODUCING THE TUMOR. (E.) Kawada, M. (Dept. Orthoped. Surg., Jikei U. Sch. Med., Japan). Jikeikai Med. J. 10(4):208-210, 1963.

Adult or 4-week-old rabbits were inj. with BeO, 100-450 mg (suspended in saline) for 1-45 inj. No tumors formed after 10 i.v. inj. (total 200-400 mg). With local admin. into the marrow or around the periosteum of the femur, osteogenic sarcomas developed within an av. of 11-19 mo. at the site of inj.; tumor incidence was 60-88%. Incidence of tumor increased with dose while at the same time the latent period decreased. Splenectomy did not increase the incidence. Metastases appeared in most organs, predominating in lungs. Numerous deaths occurred with i.v. admin., but not with local admin. The production of osseous tumors seemed to be associated more with the periosteum than with the bone marrow. Transplantation attempts were unsuccessful.

65-1912 THE INTERACTION OF 4-DIMETHYLAMINO-AZOBENZENE AND 4-AMINOAZOBENZENE WITH TISSUE CONSTITUENTS, WITH SPECIAL REFERENCE TO BILE SALTS AND OROTIC ACID. (E.) Lin, J.-K. (Dept. Biochem., Nat. Taiwan U. Coll. Med., Taipei) and T.-C. Tung. J. Formosa Med. Assn 63(10):467-475, 1964.

Bile acids and their salts, as well as orotic acid, increased the solubility of aminoazo dyes, the noncarcinogenic 4-aminoazobenzene and the carcinogenic 4-dimethylaminoazobenzene, in aqueous soln., suggesting that they could act as cocarcinogens by promoting the absorption and as anticarcinogens by promoting the excretion of these dyes when ingested by the animal. (See also CRA 3(4):#739 and #740, 1965.)

65-1913 SERUM LACTIC DEHYDROGENASE ACTIVITY IN RAT DURING THE DEVELOPMENT OF HEPATOMA INDUCED BY DIMETHYLAMINOAZOBENZENE (DAB). (Fr.) Tomb, J. (Dept. Path. Anat., U. Bordeaux Sch. Med., France), G. Delmon and J. Biraben. C. R. Soc. Biol. (Paris) 158(10):1877-1880, 1965.

Thirty rats on a protein-deficient diet to which DAB was added showed liver cancerization within 6 mo. Serum lactic dehydrogenase showed no changes during the early induction period but increased 4-5 times above normal levels upon the appearance of the first histological signs of malignancy.

65-1914 A STUDY OF EPIDERMAL TUMOURIGENESIS IN THE HAIRLESS MOUSE WITH SINGLE AND WITH REPEATED APPLICATIONS OF 3-METHYLCHOLANTHRENE AT DIFFERENT DOSAGES. (E.) Iversen, O. H. (Inst. Gen. Path., U. Oslo, Norway) and U. Iversen. Acta Path. Microbiol. Scand. 62(3):305-314, 1964.

A total of 330⁺ hairless mice (8-10-week old; strain hr/hr) received single or multiple applications (5 at 3-day intervals) of 20-methylcholanthrene (MC; total 16-1000 µg or 80-2500 µg, resp.) to the dorsum of each animal by a pipette. Within 18 mo. single doses of 16 and 32 µg produced papillomas in 7% and 10%, resp., of animals, whereas 63 and 1000 µg produced papillomas in 67% and 77%, resp. Latent time was 8.7-12.5 mo. There was strikingly little difference between the effects of 63, 125, and 1000 µg of MC; the two latter doses each induced a small number (3%) of carcinomas. With 5 applications, only the lowest dose provoked relatively few papillomas (in 17% of the mice). At 315-2500 µg, 82%-90% of animals developed papillomas. Latent time was 6.3-10.6 mo. The latter dose range provoked some carcinomas, the yield coming up to 30% with 2500 µg. It is concluded that a critical dose level exists at which a carcinogen becomes fully effective after a single application. This critical dose level corresponds to that necessary for the "step" in the tetrazolium test for carcinogenicity and thus confirms the validity of this test.

65-1915 THE EFFECT OF A CHRONIC INFLAMMATORY STIMULUS WITH CROTON OIL ON THE DEVELOPMENT OF A SARCOMA INDUCED BY 3,4-BENZOPYRENE ADMINISTERED PARENTERALLY. (It.) Zinnari, A. (Inst. Gen. Path., U. Genoa, Italy). Pathologica 56(839-840):215-219, 1964.

Twenty female albino mice (Strain SMZ; av. wt. 20 g) after a single i.p. inj. of 3,4-benzopyrene (BP; 2% in olive oil, 1 ml/mouse) were treated with croton oil (CO; 4% in olive oil) intradermally on their backs (0.25 ml 2x/wk. for 2 wk.) and then by paintings on the inj. site (2x/wk. for 6 wk., 1x/wk. for 3 mo.) for a total period of 21 wk. At the beginning of the last wk. of treatment with CO, 3/10 surviving mice developed s.c. tumors at the site of painting which grew rapidly into spindle cell sarcomas. Control mice, inj. either with BP or CO alone, and mice treated similarly with

anthracene and CO showed occasional granulomas but no malignant formation during a period of observation of 1 yr. (See also CRA 3(6):#1422, 1965.)

65-1916 CANCER OF THE LIVER ARISING ON CIRRHOSIS DUE TO CARBON TETRACHLORIDE. (Fr.)

Simler, M. (Dept. A Med., U. Strasbourg, France), M. Maurer and J. C. Mandard. Strasbourg Med. 15(10):910-918, 1964.

Described is the case of a 43-year-old man who developed chronic cirrhosis of the liver after a prolonged exposure to CCl₄. Four yr. after the beginning of his symptoms, a biopsy showed the presence (besides cirrhosis) of primary liver epithelioma.

65-1917 THE INDUCTION OF TESTICULAR TUMORS BY 20-METHYLCHOLANTHRENE IN GOLDEN HAMSTERS FOLLOWING HEMICASTRATION AND EXPERIMENTAL CRYPTORCHIDISM. MORPHOBIOLOGIC STUDY OF TTS SARCOMA. (Sp.) Llombart, A., Jr. (Dept. Histol., U. Valencia Sch. Med., Spain) and V. Sansano Pena. Acta Oncol. (Madrid) 3(1):88-106, 1964.

Following hemicastration and production of experimental cryptorchidism, 20 golden hamsters were inj. intratesticularly with 1 mg of 20-methylcholanthrene (MC) in olive oil. A marked hyperplasia of Leydig cells was produced in all animals; these cells constituted the predominant component of the preneoplastic reactive granulomas, solid adenomas and, in one case, of an epididymal carcinoma. Two hamsters developed estrogen-dependent renal carcinomas (one of them had the epididymal carcinoma). A spindle cell sarcoma which included the whole testicle and epididymus was observed in another hamster. This tumor was at the time of report in its 18th passage in vivo, having reproduced in a total of 95 hamsters. The tumor was hormone-independent and highly proliferative.

65-1918 THE CATABOLISM OF HEMOGLOBIN DURING HYPERACTIVITY OF THE RETICULOENDOTHELIAL SYSTEM INDUCED BY p-DIMETHYLAMINOAZOBENZENE. (Fr.)

Lozzio, B. (Inst. Gastroent., Nat. Inst. Health, Buenos Aires, Argentina), E. Machado, V. Lew and M. Royer. RES (J. Reticuloendo. Soc.) 1(4):293-305, 1964.

Intact Wistar rats (both sexes) and splenectomized rats were fed in their diets 4-dimethylaminoazobenzene (DAB; 0.06%) for 15 days. During the first 15 days, no hepatic lesions were observed, but intense hyperplasia was noted in the RES of the spleen, liver, lymph glands and lungs. Increased bilirubin as well as biliary, urinary and fecal urobilin were also noted. The use of Cr⁵¹-labeled RBC showed that the increased hemoglobin breakdown in DAB-fed animals was not the result of intravascular hemolysis but the result of the activity of a hyperplastic spleen.

65-1919 HOST--TUMOUR RELATIONSHIP. XIV. ANAEMIA AND HAEMOGLOBIN DISTRIBUTION IN RATS WITH TUMOURS INDUCED BY BENZOPYRENE. (E.) Brada, Z. (Cancer Res. Inst., Dept. Biochem., Brno, Czech.). Neoplasma (Bratisl.) 11(4):353-360, 1964.

Benzpyrene, 10 mg, was admin. s.c. interscapularly to 40 Wistar rats. The resulting tumors contained as much as 30% of the organism's hemoglobin (Hb), with a close relationship existing between the size of the tumor and its Hb content. This relationship was expressed mathematically as a linear relation between the logarithm of the amount of Hb and the logarithm of tumor wt. The trend of this straight line was 4/5. Despite anemia, the conc. of host Hb remained at the same level during the whole course of tumor growth, since the decrease in Hb conc. of the peripheral blood was compensated initially by an increase of Hb in the spleen, and later by an increase of Hb in the liver. The amount of tumor Hb was lower than that observed previously in transplanted tumors.

65-1920 3,4-BENZOPYRENE DETERMINATION IN THE SMOKY ATMOSPHERE OF SOCIAL MEETING ROOMS AND RESTAURANTS. A CONTRIBUTION TO THE PROBLEM OF THE NOXIOUSNESS OF SO-CALLED PASSIVE SMOKING. (E.) Galuškinová, V. (2nd Inst. Med. Chem., Charles U. Sch. Med., Prague). Neoplasma (Bratisl.) 11(5):465-468, 1964.

The conc. of 3,4-benzpyrene (BP) per 100 m³ of air measured in the atmosphere of Prague in the autumns of 1960-62 ranged from 0.3 to 4.6 µg; in a smoky social meeting room, it ranged from 2.82 to 14.4 µg. Due to this marked elevation of BP conc., it was concluded that tobacco smoke is a health hazard not only to the smoker himself, but also to those who inhale the tobacco smoke in a smoky room.

65-1921 CHEMICAL CARCINOGEN AND ONCOGENIC VIRUS: A POSSIBLE INTERACTION MECHANISM. (E.)

Hughes, P. E. (Dept. Path., U. Melbourne, Australia). Nature (London) 205:871-874, 1965.

Swiss albino mice <36 hr. old were inj. i.p. with a 0.1 ml liver protein preparation from Sprague-Dawley rats: (a) on a control diet; (b) on a control diet + in vitro exposure of the liver proteins to 3'-methyl-4-dimethylaminoazobenzene (3'-MeDAB); (c) on a diet containing 3'-MeDAB (0.06% for 10 days, followed by i.p. inj. of a 2% soln. of the carcinogen); or (d) from aminoazo dye-induced hepatomas. The various protein soln. mixed with a polyoma virus preparation and allowed to stand for 2 hr. at 0° C were then inj. into the mice 2 hr. after the initial protein soln. inj. No tumors occurred in mice given protein with dye adsorbed in vitro, while all the groups of mice given the virus showed typical neck and breast tumors but no liver tumors. Mice treated with protein from aminoazo dye-fed rat liver protein and

viral dilutions of $10^{-0.75}$ and 10^0 showed a very high incidence of runting. A 26%-29% tumor incidence occurred with the dye-fed rat protein and viral dilutions of $10^{-0.75}$ to -1.5 as compared to a 9%-17% incidence for protein from normal rats; the protein from aminoazo dye-induced hepatomas produced a 27% tumor incidence. The author noted that the experiment was based on the hypothesis that the carcinogen-binding proteins(s) is a repressor of viral oncogenesis.

- 65-1922 EXPERIMENTAL STUDIES OF PROSTATIC TUMORS. I. PRODUCTION OF THE PROSTATIC TUMOR OF RAT WITH 20-METHYLCHOLANTHRENE. (Jap.) Takenaka, I. (Dept. Urol., Hiroshima Sch. Med., Japan). Hinyokika Kyo (Acta Urol. Jap.) 10(11): 745-758, 1964.

Wistar rats were inj. intra-prostatically with 0.1 ml of a 3% soln. of 20-methylcholanthrene in Tween 80 and first tumors developed within 88 days. In the groups of animals observed for 100 days, 180 days or 181 days, the tumor incidences were 25%, 60% (3/5) and 58.9% (10/17), resp.; the total tumor incidence was 53.9%. Histologically, squamous cell carcinoma occurred in 10/14 tumors, papilloma in 2, sarcoma in 1 and mixed adenoma in 1. (See also CRA 3(4):#743, 1965 and the following 2 abstracts.)

- 65-1923 EXPERIMENTAL STUDIES OF PROSTATIC TUMORS. II. EFFECT OF SEXUAL HORMONES ON THE DEVELOPMENT OF EXPERIMENTAL PROSTATIC TUMORS. (Jap.) Takenaka, I. (Dept. Urol., Hiroshima U. Sch. Med., Japan). Hinyokika Kyo (Acta Urol. Jap.) 10(12):841-856, 1964.

In a continuation of studies reported in the previous abstract, Wistar rats were admin. 20-methylcholanthrene followed by estradiol (E), testosterone propionate depot (TP) or castration (C). The prostatic tumor developed within 74 days in the E-treated animals as compared to 80 days and 95 days in the C- and TP-treated animals, resp. The tumor incidence throughout the experiment was 60% for TP-, 87.5% for E- and 59.2% for the C-treated animals. Although a delay in the initial development of the tumor and a low incidence were seen in the animals given TP, a rapid increase in the incidence (71.3%) occurred after 6 mo.; a similar effect occurred in the C-treated animals and the incidence increased to 68.5%. However, in the animals given E, the incidence in the earlier period increased to 100% but later (6 mo.) it decreased to 85%. Histologically the tumors were of the squamous epithelial type. In addition, in the TP group, there were frequent papillomas. Metastases in the regional lymph nodes and the accessory sex organs were seen. It is postulated that both sex hormones are concerned with the development of the prostatic tumor through the pituitary-hypothalamic system. (See also CRA 3(4):#743, 1965 and the following abstract.)

- 65-1924 EXPERIMENTAL STUDIES OF PROSTATIC TUMORS. III. EFFECTS OF PITUITARY AND ADRENOCORTICAL HORMONES. (Jap.) Takenaka, I. (Dept. Urol., Hiroshima U. Sch. Med., Japan). Hinyokika Kyo (Acta Urol. Jap.) 10(12):857-874, 1964.

In a continuation of the two preceding abstracts, the animals were inj. intra-prostatically with 0.1 ml of 3% 20-methylcholanthrene (MC) in Tween 80, followed by the admin. of various hormones. In animals treated with ACTH, the tumor occurred within 120 days and the incidence was 55% after 6 mo. and 52.1% throughout the period of observation. Although the tumor was relatively large (mean wt. 1.589 g), ACTH had a slightly suppressing effect on the tumor. Human chorionic gonadotropin caused a slightly higher incidence of tumor (64.2%) but the rate after 6 mo. was only 56.4%. In the prolactin-treated animals, the tumor (squamous epithelial type) occurred within 100 days and the incidences after 6 mo. and throughout the whole period were 62.5% and 60%, resp.; the results were not too different from those seen in the animals treated with MC alone. Cortisone produced the highest incidences of tumors (64.0%-68.4%) and marked proliferative changes. Metopirone (SU-4885) admin. produced tumor incidences of 52%-52.7%. (See also CRA 3(4):#743, 1965.)

- 65-1925 CELL-FREE TRANSMISSION OF A METHYLCHOLANTHRENE-INDUCED TUMOR IN AMPHIBIANS. (It.) Zavanella, T. (Dept. Embryol., U. Milan, Italy). Tumori 50(6):485-498, 1964.

The s.c. inj. into 15 adult newts of cell-free filtrates prepared from a transplanted methylcholanthrene-induced malignant melanoma of the newt (5th passage) resulted in the development of melanomas in 9/15 animals after 1-4 mo. with metastases in all organs. Spontaneous melanoma was never observed in about 1,800 newts examined by the author.

- 65-1926 ANTIDOTAL EFFECT OF AMINOACETONITRILE AGAINST THE BIOCHEMICAL INJURY OF THE MICROSOMAL AMINO-ACID INCORPORATING SYSTEM INDUCED IN VIVO BY CARBON TETRACHLORIDE OR DIMETHYLNITROSAMINE. (E.) Mager, J. (Dept. Biochem., Hebrew U.-Hadassah Med. Sch., Jerusalem), A. Halbreich and S. Bornstein. Biochem. Biophys. Res. Commun. 18(4):576-581, 1965.

A single dose of aminoacetonitrile (AAN) was admin. s.c. 12-20 hr. prior to the admin. of liver poisons (CCl₄ or dimethylnitrosamine (DMNA)) to male rats. Assay of liver homogenates showed that the marked decline in the amino acid incorporating activity brought about by CCl₄ or DMNA could be prevented or considerably attenuated by AAN. No protective effect resulted, however, when the interval between the 2 inj. was decreased to 2 hr. or when the agents were admin. simultaneously. Addition of AAN (up to 0.002 M) to the reaction mixture also

failed to reverse the decline of amino acid incorporation following the in vivo treatment with CCl₄ or DMNA. The intracellular target of toxic injury with CCl₄ or DMNA and the protective effect of AAN seem to be located in the microsomal particles. The enhancement of the polyuridylic acid-directed incorporation of phenylalanine induced by CCl₄ or DMNA was partially reversed by pretreatment in vivo with AAN.

65-1927 MORPHOLOGICAL AND PERMEABILITY CHANGES IN THE CEREBRAL PARENCHYMA ADJACENT TO HETEROLOGOUS INTRACEREBRAL TUMORS. (E.) Krigman, M. R. (Dept. Path., Yale U. Sch. Med., New Haven, Conn.) and E. E. Manuelidis. J. Neuropath. Exp. Neurol. 24(1):49-62, 1965.

Alterations of permeability and morphology of the adjacent neural tissue (neuronal, myelin, neuroglial and vascular changes) associated with 4 different tumors heterologously transplanted to the brain of guinea pigs were attributed mainly to edema. The edema spreads with certain restrictions from vessels with altered permeability at the margin of the tumor. Three of the tumors were of human origin (tumor 178 and HC305 (glioblastomas) and melanoma 154) and one (ependymoblastoma 606) was induced with methylcholanthrene in the cerebrum of C₃H mice. The alterations in the permeability (or the breakdown of the blood-brain barrier) and in the morphology of the adjacent tissues was greatest around HC305, less around 178 and ependymoblastoma 606, and least around melanoma 154. The differences in edema around the various tumors did not correlate with tumor size or growth rate, but it did seem to depend on the type and extent of the morphological vascular changes adjacent to the tumors.

65-1928 PITUITARY TUMOURS INDUCED BY DIFFERENT DIETARY REGIMENS. (E.) Vartiainen, I. (2nd Dept. Med., U. Helsinki, Finland) and O. Heinivaara. Ann. Med. Intern. Fenn. 53(2): 69-73, 1964.

Groups of young male Sprague-Dawley rats were fed (besides mineral and vitamin supplements) for a total of 40-80 wk. the following diets: high carbohydrate (C) diet containing 80% C, 15% protein and 5% fat (17 rats); high fat diet containing 5% C, 15% protein and 80% fat (15 rats); alternating high C and high fat diets for periods of 2-8 wk. (12 rats), while the 19 controls were permitted to select their diet freely. Compared to the control animals, the groups of rats fed the diets had very large pituitaries, the largest weighing 283 mg. The enlargement of the hypophysis was due to typical

chromophobe adenomas (sometimes several/gland), and these animals also had a distinctly atrophied zona glomerulosa in the adrenal.

65-1929 ANALYSIS OF ACID MUCOPOLYSACCHARIDES EXTRACTED FROM RABBIT DERMIS AFTER VARIOUS PERIODS OF TREATMENT WITH ONCOGENIC AND IRRITATING AGENTS. (E.) Prodi, G. (Inst. Gen. Path., U. Bologna, Italy) and R. David. Ital. J. Biochem. 13(3):157-165, 1964.

In a continuation of work previously abstracted as CRA 1(1):#80, 1963 and ibid., 2(1):#42, 1964, the hyaluronic acid-chondroitinsulfuric acid ratio and the glucosamine-galactosamine ratio were studied in the dermis of rabbit skin painted 2x/wk. with 9,10-dimethyl-1,2-benzanthracene (DMBA) in benzene (0.3%) or croton oil (C0; 2.5% in olive oil) for 5-84 days. The ratios reached very high values after 30 days of treatment with C0 or DMBA, but after that time large individual differences were seen. The values of the ratios showed that there was no significant difference between the 2 treatments.

65-1930 SOLUBILIZATION OF 3,4-BENZOPYRENE BY AQUEOUS SOLUTIONS OF CETYLTRIMETHYL-AMMONIUM BROMIDE (CETAVLON). (E.) Guerritore, D. (Dépt. Gen. Path., U. Rome), L. Bellelli and M. L. Bonacci. Ital. J. Biochem. 13(4):222-229, 1964.

The solubilization of 3,4-benzpyrene by aqueous solutions of cetyltrimethylammonium bromide (cetavlon) was performed. The solubilization of the hydrocarbon began above the critical micelle conc. of the detergent and dialysis and ultra-filtration experiments have shown that the size of the micelle lies between 100 and 450 mμ.

65-1931 ENZYMES OF HISTIDINE METABOLISM IN NORMAL AND TUMOR TISSUES. HISTIDASE AND UROCANASE ACTIVITY. (E.) Krzymuska, A. (Dept. Exp. Oncol., Polish Acad. Sci., Wroclaw). Arch. Immun. Ther. Exp. 12(6):724-729, 1964.

No histidase activity was found in transplantable chrysoidin-induced hepatoma or spontaneous mammary adenocarcinoma removed from RIII and F₁ (C57Bl x RIII) hybrid mice, while Crocker sarcoma had a mean activity of 3.8 U/mg protein (liver of normal mice, 15.5 U/mg protein). No urocanase activity was found in Crocker sarcoma or spontaneous mammary adenocarcinoma, but chrysoidin hepatoma had a mean value of 8.26 U/mg protein (normal liver, 28.1 U/mg protein).

See also abstract nos.: 1682, 1685, 1693, 1694, 1695, 1696, 1697, 1698, 1702, 1703, 1704, 1705, 1708, 1710, 1712, 1717, 1719, 1755, 1756, 1760, 1761, 1954

VIRAL CARCINOGENESIS

- 65-1932 THE DUAL ORIGIN OF NONINFECTIVE ROUS SARCOMAS. (E.) Shimizu, T. (Nat. Inst. Anim. Health, Tokyo, Japan) and H. Rubin. J. Nat. Cancer Inst. 33(1):79-91, 1964.

White Leghorn chickens, Strain 813 (4 wk.), developed tumors after infection with either high or low doses of Bryan's high-titer strain of Rous sarcoma virus (RSV), which also contained the Rous-associated virus (RAV; originally isolated from the Bryan high-titer strain of RSV). All tumors induced with high RSV doses yielded initially high RSV conc., which then dwindled to 0 within 3 wk. The decrease in virus yield was accompanied first by diminished tumor growth and then by tumor regression (probably due to an immunologic reaction by the host). Tumors induced with low RSV doses yielded little or no RSV during the first few days of tumor growth, showed a max. yield about 1 mo. after infection, then viral conc. declined. Low-dose-induced tumors, which failed to produce RSV when grown in tissue culture, produced large amounts of RSV when RAV was added to the cultures. Inoc. of chickens with a low dose of RSV plus an excess of RAV resulted in a much higher proportion of virus-producing tumor cells. It was concluded that the non-infective Rous sarcomas contain no infectious RSV because of too limited co-infection or super-infection of the tumor cells with RAV (which is required for maturation of RSV). (See also CRA 1(3):#506, 1963; *ibid.*, 2(1):#85; *ibid.*, (2):#282 and #283, 1964; and *ibid.*, 3(6):#1504, 1965.)

- 65-1933 RELATIONSHIP OF CELLULAR AND HUMORAL IMMUNITY IN VIRUS CARCINOGENESIS. (E.) Allison, A. C. (Nat. Inst. Med. Res., Mill Hill, London). Life Sci. 3(12):1415-1422, 1964.

Among newborn hamsters inoc. s.c. with 10^5 or 10^6 human embryo kidney cells (H.E.K.) infected with adenovirus Type 12 (A-12), Strain 1131, almost all (9/10 and 10/10, resp.) developed cheek-pouch tumors. When the tumors first appeared, tumor cells (TC) from transplant lines H-75 and H-118 (induced by A-12 and maintained by cheek-pouch transfer) were inj. into the cheek pouch, but these tumor-bearing animals were resistant to transplantation (at 10^5 or 10^6 cells inoc., 1/8 and 6/8, resp., developed tumors). When lymph node cells from axillae of animals bearing tumors were mixed with the TC from the transplant line, the number of takes was also reduced as compared to mixtures of TC and normal lymph node cells. These results suggest that tolerance cannot be accepted as the explanation for the susceptibility of newborn animals to virus oncogenesis. Passive admin. of antiserum to A-12-infected hamsters not only failed to retard tumor formation but actually enhanced it: with infected H.E.K. cells, tumors increased from 75.0% to 85.5% when the antibody was also admin.; similarly with infected HeLa cells, tumors increased from 7.1% to 31.3%;

moreover, the latent periods were decreased with the antibody admin. Two further s.c. inj. of H.E.K. virus increased the latent period (from 36.4 to 42.5 days) and reduced the number of tumors (from 83.3% to 14.3%) in animals inj. neonatally with the oncogenic virus. The phenomenon shows that the immune cellular mechanism is capable of responding to later antigenic stimuli. No circulating antibody has been so far detected in hamsters given repeated s.c. inj. of A-12 and failing to develop tumors. It is concluded that repeated inj. of virus boost the immune cellular response but not the humoral antibody response. Newborn hamsters inj. with A-12 and subsequently inj. with the same virus in Freund's complete adjuvant (which was expected to boost both immune responses) failed to reduce the tumor take.

- 65-1934 AN ELECTRON MICROSCOPIC OBSERVATION OF MOLONEY LEUKEMIA VIRUS IN THE MAMMARY TISSUE OF GPC STRAIN MICE. (Jap., Abstract) Fukuhara, A., K. Ida and Y. Oba. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(2-3):253, 1964.

The mammary tissue of 3 pairs of female Swiss GPC mice with Moloney leukemia showed many virus particles regardless of the source of their infection: 2 were inj. directly with Moloney virus; 2 born of an infected mother and normal father were foster-nursed by infected females; 2 born of normal parents were foster-nursed by infected females. The particles consisted of a mature type possessing intensely electron-dense nucleoids and an immature type possessing nucleoids of low electron density. Some were cylindrical in shape; some contained inclusion bodies. The milk collected from 5 mice used for the foster-nursing showed viral particles in all cases. No viral particles were detectable in the mammary tissue and the milk obtained from normal mice. (See also CRA 3(4):#827, 1965.)

- 65-1935 INTERFERENCE BETWEEN LYMPHOCYTIC CHORIOMENINGITIS AND MOUSE RAUSCHER LEUKEMIA. (Fr.) Barski, G. (Dept. Tissue Cult., Gustave-Roussy Inst., Villejuif/Seine, France) and Jung Koo Youn. C. R. Acad. Sci. (Paris) 259(22) (Group. 14):4191-4194, 1964.

When male BALB/c mice, 28-35-days old, were inoc. with Rauscher leukemia virus (RLV; 10^4 - 10^5 ID₅₀ i.p.), 14/15 developed splenomegaly in an av. period of 17 days; the av. survival of the affected mice was 58.7 days. In a comparable group similarly inoc. with RLV, but inoc. 48 hr. (but not 72 hr. or 5 days) earlier with lymphocytic choriomeningitis virus (CMV; Armstrong strain; 10^4 - 10^5 ID₅₀ i.p.), only 8/17 developed splenomegaly and the av. time of its appearance was prolonged to 28 days; the av. survival of affected mice was, however, 59.3 days. Also delayed was the appearance of other signs of leukemic disease. (See also CRA 1(6):#1147, 1963.)

65-1936 THE INFLUENCE OF MOUSE LYMPHOMA VIRUS (MOLONEY VIRUS) ON RADIATION-INDUCED MYELOID LEUKEMIA. (Jap., Abstract) Yokoji, K. (Dept. Path., Hiroshima U. Sch. Med., Japan). Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 27(2-3):259-260, 1964.

In addition to the information reported previously in CRA 3(5):#1147, 1965, the author reports that in RF mice, Moloney virus admin. alone induced thymic-type lymphoma in 2/10; X-irradiation alone (300 r) induced myeloid leukemia (10%) and thymic-type lymphoma (30%); thymectomy (T) alone induced no leukemia; X-irradiation (300 r) + T induced myeloid leukemia (30%) but no lymphatic leukemia; X-irradiation + T + Moloney virus induced myeloid leukemia (60%) but no lymphoma.

65-1937 STUDY OF THE INACTIVATING EFFECT OF SOME MEDIA AND SOLUTIONS ON ROUS SARCOMA VIRUS. (Rus.) Popov, V. V. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:67-70, 1963.

The inactivation index (InI) against Rous sarcoma virus #1 was lowest with distilled water (1.0) and highest with aminopeptide medium (1.89). InI was also high with lactalbumin (1.80); it ranged between 1.24-1.56 for Hank's soln., Ehrlich soln. with or without phenol and for active or inactive bovine serum. The InI of the media increased as their chemical composition became more complex.

65-1938 INDUCTION OF CELLULAR DNA SYNTHESIS BY POLYOMA VIRUS. (E.) Dulbecco, R. (Salk Inst. Biol. Studies, San Diego, Cal.), L. H. Hartwell and M. Vogt. Proc. Nat. Acad. Sci. USA 53(2):403-410, 1965.

The DNA synthesis and the activities of enzymes involved in DNA synthesis of cell cultures derived from kidneys of 10-14-day-old mice increased markedly after infection with polyoma virus (PV). The DNA synthesized in the infected cells was predominantly cellular. The ability to stimulate the synthesis of cellular DNA appears to be a unique property of PV (among the animal viruses studied thus far) and may be related to the tumorigenic property of PV.

65-1939 INFECTIVE AGENTS IN HUMAN LEUKAEMIA. (E.) Brit. Med. J. 1:267-268, 1965.

In a review (20 references) and discussion on viral agents in leukemia, it was noted that the identity of the agents described by various workers is obscure and the relationship of these agents to the etiology of leukemia is also uncertain. The Negroni agent is now thought to be a mycoplasma and that no virus is present in the material. Other authors (see the following abstract) have not been able to isolate viral agents from pts. with acute leukemia.

65-1940 FAILURE TO ISOLATE VIRAL AGENTS FROM BONE-MARROWS OF CHILDREN WITH ACUTE LEUKAEMIA. (E.) Phillips, C. F. (Dept. Virol., Baylor U. Coll. Med., Houston, Texas), M. Benyesh-Melnick, E. H. Seidel and D. J. Fernbach. Brit. Med. J. 1:286-288, 1965.

Viral agents were not isolated from 19 bone marrow suspensions obtained from 17 children (new-born to 13 yr.) with acute leukemia.

65-1941 ISOLATION OF VIRAL AGENTS FROM HUMAN BLOOD AND THEIR RELATIONSHIP TO LYMPHATIC LEUKEMIA. (E.) Mettenleiter, M. W. (Degen. Dis. Res. Found., 885 Park Ave., New York, N. Y.), J. H. Mannheim and P. R. Borchardt. Oncologia (Basel) 16:307-311, 1963.

When blood specimens from pts. (age 4-18 yr.) with lymphatic involvements of 10 days or less were examined for virus by inoc. into 2-day-old embryonated White Leghorn chicken eggs, 2 virus strains were isolated and their pathogenicity augmented to the extent of obtaining titratable antigens. On crossing these antigens with sera from leukemic pts. (chronic lymphatic leukemia or myelocytic leukemia) or control pts., a definite reaction occurred between the isolates and the chronic lymphatic leukemia sera; the hemoinhibition agglutination test gave similar results. Viral activity of strains was further indicated in tests with cell cultures.

65-1942 THE VIABILITY AND ADAPTABILITY OF LEUKEMIA ISOLATES FROM HUMAN BLOOD. (E.) Mettenleiter, M. W. (Degen. Dis. Res. Found., 885 Park Ave., New York, N. Y.), J. H. Mannheim and P. R. Borchardt. Oncologia (Basel) 18(4):250-255, 1964.

In a continuation of CRA 3(7):#1941, 1965, the virulence of the leukemia agents obtained from the human blood was increased 4x by prolonged serial passages in chick embryos. The resulting antigen preparations verified the previously reported results with sera from chronic lymphatic leukemia pts. In the complement fixation and hemagglutination test, more precise serological determinations were achieved. Additional evidence of the leukemic etiology of the viral agents was substantiated by the establishment of the strains in mice. Antigens prepared from mouse-adapted material were found to be identical to those prepared from chicken embryos.

65-1943 CYTOCHEMICAL STUDIES IN EXPERIMENTAL MALIGNANT HEMOPATHIES. IDENTIFICATION OF CYTOPLASMIC RNA IN PATHOLOGIC CELLS OF FRIEND'S MURINE LEUKEMIA. (It.) Buonanno, G. (Inst. Spec. Path. Med., U. Naples, Italy), G. Catalano, F. Cocco, S. Formisano and E. Turrisi. Boll. Soc. Ital. Biol. Sper. 40(20):1230-1232, 1964.

Cytochemical studies were performed on the bone marrow and spleen of Swiss mice inoc. i.p. with 0.2 ml of spleen homogenates (suspended in 10% physiological soln. and centrifugated) obtained from a mouse infected with Friend leukemia. Metachromatic reactions were obtained using toluidine blue up to minimal conc. of 1/1,000 (alcohol soln.) and 1/10,000 (aqueous soln.) and for pH values of 5.6-4.6 (max. between 4.8-4.6). The Feulgen reaction showed no evidence of DNA-positive cell localization outside of the nucleus. It is concluded that the cytoplasmic component showing metachromatic characteristics after staining with toluidine blue is composed of cellular structures containing RNA. (See also the following abstract.)

- 65-1944 CYTOCHEMICAL STUDIES IN EXPERIMENTAL MALIGNANT HEMOPATHIES. I. FRIEND'S MURINE LEUKEMIA. (It.) Buonanno, G. (Inst. Spec. Path. Med., U. Naples, Italy), G. Catalano, F. Cocco, S. Formisano and E. Turrisi. Haematologica 49(6):461-470, 1964.

Further cytochemical studies on the bone marrow and spleen of Swiss mice infected with Friend leukemia have revealed the following: no change in the intense metachromatic staining characteristics with toluidine blue throughout the course of the disease; progressive decrease in intensity of polysaccharide staining (Hotchkiss method) from day 6 on and reaching 0 on day 22 in leukemic animals; progressive decrease of lipid staining (Sheehan-Storey reaction) from day 8 on in leukemic animals; progressive decrease of peroxidase staining (Sato-Sekiya method) from day 8 on and reaching values around 0 by day 22 in leukemic animals. It is concluded that cytochemical disturbances occur during the early phases of Friend leukemia and correspond to the phase of erythroblastic reaction prior to the leukemic diffusion of the disease. (See also the preceding abstract.)

- 65-1945 TUMOR AND VIRUS ANTIGENS OF SIMIAN VIRUS 40: DIFFERENTIAL INHIBITION OF SYNTHESIS BY CYTOSINE ARABINOSIDE. (E.) Rapp, F. (Dept. Virol., Baylor U. Coll. Med., Houston, Texas), J. L. Melnick and T. Kitahara. Science 147:625-627, 1965.

In a further study on cells infected with the papovavirus SV40 which not only synthesize viral antigen but also synthesize the specific nonviral antigen found in SV40-induced tumors (see CRA 3(2):#312 and *ibid.*, (5):#1136, 1965 and the following abstract), it was found that cytosine arabinoside (10 µg/ml) added to SV40-infected cercopithecus monkey kidney cells inhibited the synthesis of virus antigen as judged by either complement-fixation or immunofluorescence techniques but the synthesis of tumor antigen was not affected. The addition of iododeoxyuridine (50 µg/ml) to the infected cells did not inhibit the synthesis of either the tumor or the virus antigen

but it did prevent the development of infectious virus. (See also CRA 1(12):#2143, 1964.)

- 65-1946 THE INCORPORATION OF SV40 GENETIC MATERIAL INTO ADENOVIRUS 7 AS MEASURED BY INTRANUCLEAR SYNTHESIS OF SV40 TUMOR ANTIGEN. (E.) Rapp, F. (Dept. Virol., Baylor U. Coll. Med. Houston, Texas), J. L. Melnick, J. S. Butel and T. Kitahara. Proc. Nat. Acad. Sci. USA 52(6):1348-1352, 1964.

A strain of adenovirus 7 (AD 7) once contaminated with SV40 but now SV40-free was found to contain the genetic information necessary to induce synthesis of a new intranuclear antigen. The antigen (detectable by immunofluorescence and complement-fixation techniques) is immunologically identical with the tumor antigen (TA) induced by infectious SV40 in cells transformed by the papovavirus. The SV40 TA is synthesized in various mammalian cells (monkey, human, rabbit, hamster) following exposure of the cells to the virus; however, adenovirus penetration or replication seems required before synthesis of the new antigen takes place. The information for SV40 TA was found to be transmitted to daughter cells during mitosis. It is believed that incorporation or hybridization of a portion of the SV40 virus genome with AD 7 virus genome might explain the observed phenomena. (See also CRA 3(2):#312; and *ibid.*, 3(5):#1136, 1965.)

- 65-1947 EXPERIMENTAL STUDIES ON HISTOGENESIS OF POLYOMA INDUCED IN MICE. (Jap.) Nishida, K. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(4/5):291-315, 1963.

In a more detailed account of CRA 2(7):#1325, 1964, additional data are given on the tumor incidence in 8 AKR mice inoc. with SE polyoma virus. All the animals developed parotid gland and thymus tumors; other tumors included submandibular gland (2), liver (1) and pleura (1). The histology of the tumors in the 2 strains of mice (AKR and Swiss) is also presented.

- 65-1948 MULTIPLICATION OF SIMIAN VIRUS 40 IN PRIMARY RHESUS, LLCMK₂, AND MS CELLS. (E.) Easton, J. M. (NIH, Bethesda). Life Sci. 4(1):73-75, 1965.

In a study on 3 cell lines, MS and LLCMK₂ (both strains originally derived from monkey kidney), and primary rhesus kidney (PRK), SV40 showed similar growth curves in LLCMK₂ and PRK but differed markedly in MS cells where SV40 failed to multiply and did not induce CPE. (See also CRA 2(1):#80, 1964.)

- 65-1949 THE SHOPE PAPILLOMA-CARCINOMA COMPLEX AS A MODEL FOR INVESTIGATION OF TUMOR IMMUNOLOGY AND VIRAL ONCOLOGY. (E.) Evans, C. A.

Dept. Microbiol., U. Washington Sch. Med., Seattle). Virus (Tokyo) 14(1):13-25, 1964.

In addition to the work presented in CRA 3(6):493, 1965, discussions are presented of the general etiology of tumors, immune mechanisms, immunological enhancement and vaccination. (See also CRA 1(2):#252; and ibid., (6):#1160, 1963.)

65-1950 STUDIES ON THE ONCOGENIC ACTIVITY OF THE POLYOMA VIRUS IN VITRO AND IN VIVO. II. DEVELOPMENT OF PATHOLOGIC LESIONS IN THE SYRIAN HAMSTER IN THE COURSE OF INFECTION WITH THE POLYOMA VIRUS. (E.) Chłap, Z. (Dept. Path. Anat., Med. Acad., Cracow, Poland), Kowalczykowska and Z. Porwit-Bóbr. Acta Med. 1. 4:93-103, 1963.

Golden hamsters infected (s.c. or i.p.) 24 hr. after birth with SE polyoma virus, the following changes were seen: presence of distinct necrotic-hemorrhagic lesions; absence of proliferative changes at the inj. site; absence of proliferation in the kidneys; a predilection to development of malignant tumors in the heart (especially in the right auricle); the distinct anaplastic character of sarcomas, which in some cases undergo differentiation to osteochondrosarcoma. Due to the difference in the pattern of the pathologic lesions, the authors note that the viral strain may be a selected variant with specific properties. (See also CRA 3(4):#822, 1965.)

65-1951 TRANSFORMATION OF BONE MARROW CULTURES FROM LEUKEMIC AND NON-LEUKEMIC CHILDREN. (E.) Benyesh-Melnick, M. (Dept. Virol., Baylor U. Coll. Med., Houston, Texas). Rev. Roum. Microbiol. 1(2):109-114, 1964.

See CRA 1(8):#1580, 1963. (See also CRA 3(3):513, 1965.)

65-1952 ANTIGENS ASSOCIATED WITH A TUMOR VIRUS: REJECTION OF ISOGENIC SKIN GRAFTS FROM LEUKEMIC MICE. (E.) Breyere, E. J. (Dept. Biol., American U., Washington, D. C.) and L. B. Williams. Science 146:1055-1056, 1964.

Skin grafts from leukemic adult Balb/cDe mice inoc. s.c. when newborn with a leukemia virus isolated from C3H plasma cell tumor 70429) were rejected upon genetically compatible transplantation, showing that skin of leukemic mice contains virus-associated antigen. Tumors often developed under grafts in non-immune recipients after an av. of 46 days. The donor origin of some of these tumors, as well as the fact that this virus does not induce solid tumors at the inoc. site, indicate that these tumors arose from leukemic cells present in donor skin at the time of grafting (rather than being virus-induced subsequently).

65-1953 RELATIONSHIPS OF VIRUSES, CHROMOSOMES AND CARCINOGENESIS. (E.) Nichols, W. W. (South Jersey Med. Res. Found., Camden, N. J.). Hereditas 50:53-80, 1963.

In a more detailed account of the article previously abstracted as CRA 1(5):#942, 1963, additional studies showed that the Rous sarcoma (Schmidt-Ruppin strain) carried through serial transplantation in tissue culture exhibited similar changes as reported above but probably at a more rapid rate while still maintaining the ability to produce in vivo tumors. Rous sarcoma virus added to normal rat embryo cells appeared to be able to produce chromosome breakage. A study was also done on the measles virus. (See also CRA 3(2):#307, 1965.)

65-1954 AN ELECTRON MICROSCOPE STUDY ON VIRAL CHICKEN SARCOMA. II. PATTERNS OF VIRUS MULTIPLICATION IN TUMOR CELLS SUBMITTED TO X-RAY INDUCTION. (Jap.) Narimatsu, E. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(4-5):271-290, 1963.

In a continuation of the work presented in CRA 3(1):#125, 1965, the detectability of virus particles (employing an induction procedure) in the tumor cells of chicken sarcoma induced by Rous (R) No. 1, Chiba (C) and Aichi-Eiken (AE) strains of virus was determined. When X-rays, 20-methylcholanthrene (MC) and nitromin were used as inducing agents, the rate of detection for the C, AE and R strains was, resp.: control, 0.32%, 5.14% and 10.6%; 200 r of X-rays, 36%, 22.3% and 50.9%. Rates for MC and nitromin, tried only on C strain, were 18% and 7.6%, resp. Increased doses of X-rays were not as effective in elevating the virus detectability. On the surface of the induced tumor cell, a tiny protrusion of the cell membrane occurred like a bud with an increase in the electron-density of the area; the budding finally resulted in the formation of mature virus particles.

65-1955 DIFFERENT LEUKEMIA FORMS FOLLOWING INFECTION WITH THE VIRUS OF MOUSE MYELOID LEUKEMIA. (Ger.) Georgii, A. (Inst. Path., U. Munich, Germany). Verh. Deutsch. Ges. Path. 48:146-149, 1964.

AB strain mice, infected a few hr. after birth with wild virus from primary mouse Sarcoma 1, developed myeloid leukemia (21 mice), myeloblastic leukemia (18 mice, of which 5 had chloroleukemia (CL)), myelosarcomatosis (6 mice, of which 3 had CL), reticulosarcomatosis (9 mice, of which 1 had CL) and monocytic leukemia (2 mice).

65-1956 CARCINOMA IN THE DOMESTIC RABBIT FOLLOWING PAPILOMA INDUCED WITH NUCLEIC ACID EXTRACTS FROM MALIGNANT TISSUES OF THE SHOPE SYSTEM.

- (E., Abstract) Ito, Y. (Dept. Viral Oncol., Aichi Cancer Inst., Nagoya, Japan). Proc. Am. Assn. Cancer Res. 6:32, 1965.
- 65-1957 FURTHER STUDIES OF A LEUKEMIA VIRUS ISOLATED FROM Ha/ICR SWISS MICE. (E., Abstract) Buffett, R. F. (Roswell Park Mem. Inst., Buffalo, N. Y.), J. T. Grace, Jr. and L. A. Di Berardino. Proc. Am. Assn. Cancer Res. 6:9, 1965.
- 65-1958 THE INFECTIVITY OF DENSITY GRADIENT PURIFIED B PARTICLES FROM C3H MAMMARY TUMOR. (E., Abstract) Daniel, C. W. (Cancer Res. Genet. Lab., U. California, Berkeley), K. B. De Ome, D. R. Pitelka and K. K. Sekhri. Proc. Am. Assn. Cancer Res. 6:12, 1965.
- 65-1959 LYMPHATIC LEUKEMIA IN RATS AND MICE INOCULATED WITH FRIEND VIRUS. (E., Abstract) Dawson, P. J. (U. Newcastle/Tyne, England) and W. M. Rose. Proc. Am. Assn. Cancer Res. 6:13, 1965.
- 65-1960 NUCLEOTIDE-PHOSPHATASE ACTIVITY ASSOCIATED WITH MURINE LEUKEMIA VIRUSES. (E., Abstract) De-Thé, G. (NCI, Bethesda). Proc. Am. Assn. Cancer Res. 6:15, 1965.
- 65-1961 LARGE-SCALE PRODUCTION OF MOLONEY MURINE LEUKEMIA VIRUS IN TISSUE CULTURE. (E., Abstract) Toplin, I. (Chas. Pfizer & Co., Inc., Maywood, N. J.), D. Riccardo and E. M. Jensen. Bact. Proc. 1965:114.
- 65-1962 HISTOCHEMICAL OBSERVATIONS OF THE NUCLEIC ACID AND ACID POLYSACCHARIDE ON THE PATHOGENESIS OF THE ROUS SARCOMA INDUCED BY ROUS VIRUS ON THE CHORIO-ALLANTOIS MEMBRANE OF THE CHICK EMBRYO. (Ch.) Shieh, S.-P. (Dept. Exp. Morph., Inst. Exp. Med., Chinese Acad. Med. Sci., Peking), T.-T. Liang and A.-L. Ning. Acta Anat. Sinica 7(1):23-35, 1964.
- 65-1963 APPLICATION OF FLUORESCENT ANTIBODY TECHNIQUES TO VIRAL INFECTIONS. (E.) Riggs, J. L. (Viral Lab., Dept. Public Health, Berkeley, Cal.). Industr. Med. Surg. 34(3): 269-277, 1965.
- 65-1964 PRODUCTION OF INTERFERON BY CELLS INFECTED WITH POLYOMA VIRUS. (E., Abstract) Inglot, A. and E. Niedźwiedzka. Arch. Immun. Ther. Exp. 12(Suppl.):22, 1964.
- 65-1965 RAT VIRUS (RV) INFECTIONS OF PREGNANT, FETAL AND NEWBORN RATS. (E.) Kilham, L. (Dept. Microbiol., Dartmouth Sch. Med., Hanover, N. H.) and V. H. Ferm. Proc. Soc. Exp. Biol. Med. 117(3):874-879, 1964.
- 65-1966 COMPARATIVE ONCOGENIC PROPERTIES OF DEOXYRIBONUCLEIC ACID FROM PRIMARY PAROTID GLAND TUMORS, PASSAGE PAROTID GLAND TUMORS AND POLYOMA VIRUS. (E.) Hays, E. F. (Dept. Biophys., U. California, Los Angeles). Cancer Res. 24(10):1741-1744, 1964.
- 65-1967 ELECTRON-MICROSCOPIC STUDY OF THE MOUSE LEUKEMIA VIRUS (GROSS), AND OF TISSUES FROM MICE WITH VIRUS-INDUCED LEUKEMIA. (E.) Feldman, D. G. (VA Hosp., Bronx, N. Y.) and L. Gross. Cancer Res. 24(10):1760-1783, 1964.
- 65-1968 ENZYME STUDIES IN VIRUS-INDUCED NEOPLASMS. I. THE EFFECT OF A MURINE LEUKEMIA ON ENZYMES OF ONE-CARBON METABOLISM AND ON PHOSPHOMONOESTERASES. (E.) Silber, R. (Dept. Med., New York U. Sch. Med., N. Y.), R. P. Cox, J. R. Haddad and C. Friend. Cancer Res. 24(11): 1892-1897, 1964.
- 65-1969 RECENT TOPICS ON ROUS SARCOMA VIRUS. SPECIFICALLY NON-INFECTIOUS TUMORS. A REVIEW. (Jap.) Shimizu, T. (Test Lab. Domestic Anim., Min. Agr., Japan). Birus (Virus, Tokyo) 14(2):55-59, 1964.
- 65-1970 ROLE OF MOUSE LYMPHOMA VIRUS IN INDUCTION OF MYELOID LEUKEMIA BY X-RAY. (E.) Yokoro, K. (Dept. Path., Francis Delafield Hosp., New York, N. Y.), H. Takemoto and A. Kunii. Ann. N. Y. Acad. Sci. 114(1):203-212, 1964.
- 65-1971 EXPERIMENTAL VIRAL LEUKAEMIA AS A RHYTHMIC GROWTH PROCESS. III. SYSTEMATIC FLUCTUATIONS OF ENZYMIC ACTIVITIES CONNECTED WITH NUCLEOTIDE METABOLISM AND DNA SYNTHESIS DURING THE LEUKAEMIC PROCESS IN VIVO. (E.) Říman, J. (Dept. Nucleic Acids, Czech. Acad. Sci., Prague), J. Seifert and J. Korb. Folia Biol. (Praha) 10(6) 415-426, 1964.
- Enzymatic activities (EA) were determined in plasma supernatant (ATPase and pyruvate phosphokinase) and leukemic cells (DNA polymerase) of white Leghorn chicks susceptible to BAI Strain A virus in whom it produces myeloblastosis. EA were found to fluctuate systematically according to the stage of growth of the leukemic cells, i.e., they increased significantly in both plasma and cells during the resting phases (low mitotic activity phases) of leukemic cell growth in vivo.
- 65-1972 CYTOPATHOGENIC VIRUS, DETECTED DURING THE CULTIVATION OF POLYOMA VIRUS. (Rus.)

Feldmane, G. I. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:13-18, 1963.

An unidentified cytopathogenic virus was found in association with polyoma SE virus, Strain 2510, during the multiplication of the latter in mouse embryo tissue cultures. This virus caused CPE in 7 different human, rodent and porcine embryo tissue cultures. Virus-containing culture fluid did not agglutinate guinea pig RBC (in the cold) nor chicken RBC (at room temperature). Apparently, the unidentified virus with the CPE did not depress the oncogenic properties of polyoma virus (which was present in the same material).

65-1973 METHOD OF APPEARANCE OF HEMAGGLUTININS OF POLYOMA VIRUS. (Rus.) Feldmane, G. I. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:61-65, 1963.

Optimal conditions for the preparation of hamster heart and kidney tissues for the detection of hemagglutinins (H) of SE polyoma virus (Strain 2510) were studied. It was found that heating the virus-containing material up to 37°C immediately prior to reaction was sufficient for the removal of non-specific inhibitors of the hemagglutination reaction. Evidently, at room temperature H of polyoma virus could be bound with tissue particles and transferred to the sedimented fraction during the centrifugation of the material even at low rpm (3,000). Thus, to preserve polyoma virus H it is expedient to use a non-centrifuged tissue suspension.

65-1974 ATTEMPT AT CULTIVATION OF SHOPE PAPILLOMA VIRUS IN TRYPSINIZED MONOLAYER CULTURES OF RABBIT KIDNEY EMBRYO CELLS. (Rus.) Nagaeva, L. I. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:19-26, 1963.

In a study on rabbit embryo kidney cell cultures, the lowest Shope papilloma virus titer which showed a CPE was 10^{-4} . The development and growth of papilloma on rabbit skin also occurred in all dilutions up to and including 10^{-4} . Degenerative changes in virus-infected cells are also discussed. (See also the following abstract.)

65-1975 STUDY OF FACTORS, EFFECTING THE DEVELOPMENT OF SHOPE PAPILLOMA IN DOMESTIC RABBITS. (Rus.) Nagaeva, L. I. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:33-40, 1963.

Of 90 domestic rabbits infected with Shope papilloma virus (SPV) (topical treatment with cell-free viral material) 28 (31%) developed papilloma (P) after 28-50 days. After treatment of 95 rabbits with turpentine + acetone and followed by infection with SPV, 81 (85%) developed P after 18-30 days. P growth and development was greatest in rabbits aged 3-6 mo. Changes in room

temperature or in the season of the year had no effect on P growth and development.

65-1976 ATTAINMENT OF "NON-INFECTIOUS" FORMS OF ROUS SARCOMA. (Rus.) Popov, V. V. Tr. Inst. Mikrobiol., Akad. Nauk Latv. SSR (Riga) 20:27-31, 1963.

When Strain Carr Rous Sarcoma #1 was inj. intracutaneously into white leghorn chickens at various dilutions of virus material (10^{-1} - 10^{-6}) some tumors developed at the highest dilution. These tumors were assayed for virus content by inj. of cell-free extracts (CFE) into chickens. When 2-3.5 ml of the CFE of 13 tumors was inj. i.m., no virus was found; when 0.2 ml of the CFE of 24 of the tumors was inj. intracutaneously, 5 showed virus. Tumors which grew from 10^{-1} - 10^{-4} dilutions showed active virus. The virus-free tumors remained non-infectious.

65-1977 SUSCEPTIBILITY AND RESISTANCE TO VIRAL LEUKEMOGENESIS IN THE MOUSE. I. BIOLOGIC DEFINITION OF THE VIRUS. (E.) Tennant, J. R. J. Nat. Cancer Inst. 34(5):625-632, 1965.

A leukemogenic virus, BALB/Tennant-leukemia (B/T-L), previously isolated from a lymphoid leukemia occurring in a BALB mouse strain, was defined biologically by titration in sucklings of the BALB/cJ strain and by determination of its virulence for BALB/cJ mice of various ages and for sucklings and adults of a spectrum of 11 other strains. The virus was antigenic in guinea pigs as demonstrated by serum neutralization tests, but rabbits did not develop measurable neutralizing antibodies to the virus. In the 5th passage, at which level the virus was used throughout these studies, the titer of the virus was approx. 10^{-4} in the primary (BALB/c) strain. When inoc. within the first few days of life with a 10^{-1} dilution of virus, 100% of these mice died with lymphoid leukemia at an av. age of 3.0 mo. Leukemia induction decreased among those inoc. at a later age, or at a higher dilution of virus, as evidenced by a drop in percentage and a gradual lengthening of the latent period. The pattern of response to the virus in allogeneic hosts was examined for a possible direct correlation between the response of a given host strain to the virus and the histocompatibility-2 (H-2) allele carried by that strain. No direct correlation was found, but there were indications that the H-2 constitution of the host might play a significant role in susceptibility to the virus, and further studies are in progress. Potent leukemogenic viruses were recovered from spontaneous leukemias of the AKR/J and C58/J strains by cell-free passage in isogeneic sucklings. One of these C58 filtrates also induced mammary tumors which appeared in 6 of 7 C58 females at 3 mo. of age. Mammary tumors are rarely seen among mice of this strain.

- 65-1978 SUSCEPTIBILITY AND RESISTANCE TO VIRAL LEUKEMOGENESIS IN THE MOUSE. II. RESPONSE TO THE VIRUS RELATIVE TO HISTOCOMPATIBILITY FACTORS CARRIED BY THE PROSPECTIVE HOST. (E.) Tennant, J. R. *J. Nat. Cancer Inst.* 34(5): 633-641, 1965.

Two strains of mice, congenic, with a proved difference at the H-2 locus, manifested a 20% difference in susceptibility to viral leukemogenesis when inoc. with the BALB/Tennant-leukemia (B/T-L) virus as sucklings. Crosses were made between females of the BALB/c strain, primary to the virus, and males of each of 8 unrelated "foreign" strains, some of which were resistant and some susceptible to the virus. With one exception (C57BR/cdJ), F₁ offspring were 92%-100% susceptible to the virus, regardless of partial or total resistance of the foreign parent; offspring of the (BALB/cJ x C57BR/cd) cross appeared to be totally resistant. F₂ subjects of crosses between the BALB/c strain and each of two totally resistant strains (C3HeB/FeJ and C57BR/cdJ) were inoc. as sucklings with virus and serotyped as adults for major H-2 antigens. The first cross yielded 72% leukemia induction, the second cross only 39%; no correlation was found between the H-2 serotype of the host and its susceptibility or resistance to leukemogenesis by the virus. Backcross individuals of the cross BALB/cJ x C3HeB/FeJ yielded 100% leukemia when F₁ females were mated to BALB/cJ males, but only 6% (within spontaneous incidence bounds) when the males derived from the C3HeB/FeJ strain; again, no correlation was found between H-2 serotype and reactivity of the host to the virus. After one passage through F₁, F₂, or "foreign" strain mice, virus was returned to the BALB/cJ strain for evidence of alteration of the virus such as might be expected if coating of the virus by protein from the cell membrane had occurred in passage through the intermediate host. No such evidence was found. These results suggest that the H-2 constitution of the host may be a contributing factor to viral leukemogenesis, but is not the predominant factor.

- 65-1979 MORPHOLOGIC OBSERVATIONS OF GREEN MONKEY KIDNEY CELLS AFTER SINGLE AND DOUBLE INFECTION WITH ADENOVIRUS 12 AND SIMIAN VIRUS 40. (E.) O'Connor, G. T. (NCI, Bethesda), A. S. Rabson, R. A. Malmgren, I. K. Berezsky and F. J. Paul. *J. Nat. Cancer Inst.* 34(5): 679-693, 1965.

Sequential morphologic changes in African green monkey kidney (GMK) cells after single infection with adenovirus (AD) 12 and double infection with AD 12 plus SV40 were studied by light and electron microscopy. A pronounced nuclear stippling was the first significant change noted in both groups 16 hr. after infection. This stippling resulted from an intranuclear accumulation and clumping of basophilic, electron-dense material. This characteristic nuclear alteration, never

observed in the uninfected controls, progressively involved most cells and was ultimately associated with typical AD cytopathic effects (CPE) in both the singly and doubly infected cultures. After 20 hr. incub., AD particles first appeared in those cultures infected with both viruses, and after 48 hr. up to 80% of the cells examined contained intranuclear AD particles. This was in contrast to the group infected with AD 12 only, wherein virus particles were found in less than 5% of cells even after 72 hr. incub. The dissociation between viral synthesis and the nuclear manifestations of viral CPE was further illustrated by the absence of any specific viral antigen detectable by fluorescent-antibody technics in most cells of the singly infected group. Attempts to induce production of AD particles in cells with altered nuclei, but without virus particles, by methods other than double infection with SV40 were not successful. Growth enhancement of AD 12 by SV40 in GMK cells occurred only when the SV40 was added prior to, or simultaneously with, the AD. If the inoc. sequence was reversed, the SV40-enhancing effect was inhibited, as evidenced by decreased AD production. This inhibition was partial if the SV40 inoc. was delayed for as little as 30 min. after the initial inoc. of AD 12 and was complete when the interval extended to 6 hr.

- 65-1980 IMMUNITY AND ANTIBODY FORMATION INDUCED BY INTRAPERITONEAL OR SUBCUTANEOUS INJECTION OF KREBS-2 ASCITES TUMOR CELLS TREATED WITH INFLUENZA VIRUS. (E.) Eaton, M. D. (Harvard Sch. Med., Cambridge, Mass.), J. D. Levinthal, A. R. Scala and M. L. Jewell. *J. Nat. Cancer Inst.* 34(5):661-672, 1965.

Incubation of Krebs-2 ascites tumor cells with influenza virus at high multiplicity reduced the tumor-producing capacity of cell suspensions. These virus-treated cells could then be used as an antigen to stimulate resistance to the tumor when given i.p. An attempt was made to define the optimal conditions of virus treatment for a nonlethal but effective antigen. Since less than 10 Krebs-2 cells given i.p. produced lethal ascites tumors in most Swiss mice, immunization with fully viable cells by this route was virtually impossible. But some mice could be given large numbers of cells s.c., with production of immunity to i.p. challenge. Virus-treated cells given s.c. failed to immunize. Quantitation of the cell dose required for immunization indicated that a single i.p. inj. of 10^3 - 10^4 virus-treated cells produced some resistance, but multiple doses of 10^3 - 10^5 cells were more effective. Similar data were obtained by s.c. immunization with untreated cells against i.p. challenge. The serum from mice hyperimmunized with Krebs-2 cells gave specific reactions by fluorescein-antibody labeling of surface antigens. With other tumors a reaction was observed with 1%-5% of cells in a suspension. When complement was present, the labeling of surface antigens of Krebs-2 cells was followed by cytotoxicity.

- 65-1981 VIRAL GROWTH AND VIRAL ONCOGENESIS IN BRAINS OF NEWBORN HAMSTERS INOCULATED WITH POLYOMA VIRUS. (E.) De Estable, R. F. (NCI, Bethesda), A. S. Rabson and R. L. Kirschstein. J. Nat. Cancer Inst. 34(5):673-678, 1965.

The growth of polyoma virus in the brains of intracerebrally inoc. newborn hamsters was characterized by a decrease in the amount of virus on the day after inoc., a rise to a peak 2-3 days after inoc., and a progressive decline to complete absence of detectable virus in 8-10 days. Tumor was first demonstrable histopathologically 10 days after inoc. By transplantation of entire brains of inoc. animals to s.c. tissues of adult recipients, there was evidence that neoplastic cells were present in the brains 4, 5, and 11 days after inoc.; however, the transplantation method does not appear to be a reliable indication of the presence of tumor.

- 65-1982 THE NUCLEOTIDE COMPOSITION OF THE RNA OF THE AVIAN MYELOBLASTOSIS VIRUS (BAI, STRAIN A) AND OF THE NUCLEIC ACIDS OF LEUKAEMIC MYELOBLASTS. (E.) Trávníček, M. (Dept. Nucleic Acids, Czech. Acad. Sci., Prague), L. Bůrič, J. Říman and F. Sorm. Neoplasma (Bratisl.) 11(6):571-584, 1964.

The nucleotide composition of the RNA present in the nucleus, microsomal and ultramicrosomal fraction and high molecular and low molecular fractions of the soluble RNA of myeloblasts isolated from the blood of leukemic chicks was analyzed. The RNA of the BAI virus, strain A, was also isolated and analyzed and its nucleotide composition was compared with the composition of nucleic acids isolated from the individual cellular fractions. The soluble RNA of the cell (S_{PH5}-RNA) was found to approach most closely the viral nucleic acid, especially as regards the percentual representation of guanine, uracil and adenine.

- 65-1983 AGENT ISOLATED FROM HUMAN LEUKAEMIC SERUM, CAUSING TRANSFORMATION OF CELLS IN VITRO. (E.) Závada, J. (Inst. Virol., Czech. Acad. Sci., Bratislava), E. Mrena, Z. Zavadová, B. Rada and E. Kováčová. Neoplasma (Bratisl.) 11(6):649-654, 1964.

When the serum from a 21-year-old man with acute myeloblastosis was added to BHK-21 baby hamster kidney cells, the cells showed signs of the loss of contact inhibition and a considerable number of giant cells appeared; the transformed culture has been carried in passages for more than 1.5 yr. When adult hamsters were inoc. s.c. with 1.5×10^5 control BHK-21 cells or transformed BHK-21 cells, all the animals developed tumors after 44 days (av. tumor wt. was 0.74 g and 4.9 g, resp.). Similar results occurred when a second sample, stored for 1 yr. at -60°C, was used. The

transforming capacity was also seen in hamster spleen cells, but no visible changes were seen in L or HeLa cells (inoc. with medium from transformed BHK-21 cells) or in the amniotic sac or chick embryo chorioallantoic membrane. Electron microscopy revealed the presence of a virus-like particle from the BHK-21 cells with a diameter of 130 mμ in specimens from transformed cultures but not in those from normal cultures.

- 65-1984 SARCOMAS IN ALBINO MICE INOCULATED WITH ROUS CHICKEN TUMOUR MATERIAL. (E.) Jonsson, N. (Inst. Path., U. Lund, Sweden). Acta Path. Microbiol. Scand. 62(4):539-556, 1964.

In a more detailed account of CRA 1(5):#966, 1963, s.c. inoc. of a tumor suspension of Rous chicken sarcoma (Schmidt-Ruppin strain) into newborn Swiss mice produced sarcomas in 30% of the surviving animals after 20-40 days; a few animals had lung metastases. Inoc. of cell-free filtrates gave negative results; mice 13 days of age and older were resistant. The sarcoma was transplanted to adult mice, but the metastases were seen only after transplantation to newborn animals. The presence of virus in the mouse tumors was shown by back-transfer to chickens, in which inoc. of a suspension of mouse tumor tissue resulted in a tumor with the appearance of Rous sarcoma; material from late mouse passages was also effective. No virus was seen in cell-free preparations. (See also CRA 2(2):#313, 1964.)

- 65-1985 THE IN VIVO GROWTH MECHANISM OF AVIAN ROUS SARCOMA. (E.) Pontén, J. (Dept. Path., U. Uppsala, Sweden). Nat. Cancer Inst. Monogr. 17:131-145, 1964.

When the transplantability of Bryan "high titer" Rous sarcoma virus (RSV) in histocompatible chickens grafted with skin grafts and inoc. with tumor cells from the same donor was determined using sex chromosomes as cell markers, up to 50% of the dividing cells were of donor origin during the early growth period but this percentage fell rapidly with time and no mitotic donor cells were found in samples of 30-50 metaphases taken later than 6 days after cell inoc. It was suggested that RSV cells after a phase of rapid proliferation cease to divide and possibly disintegrate. (See also CRA 1(5):#929, 1963.)

- 65-1986 CYTOPATHOLOGICAL STUDY ON MOUSE EMBRYO TISSUE CULTURE INFECTED WITH POLYOMA VIRUS. (Jap.) Nishida, K. (Dept. Path., Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 24(6):391-397, 1963.

When mouse embryo cells were infected with SE polyoma virus (485-6 strain), the virus released into the culture increased steadily in titer 6-8 days after infection and reached a max. on day 14. The appearance of the virus and the degree of virus

multiplication was approx. parallel with the development and intensity of the CPE. The spindle cells were somewhat resistant and degenerated only after 8 days of infection; by day 14 they were completely detached from the glass surface. In the early stages of infection the nuclei showed marked swelling, disarrangement of chromatin and enlargement of the nucleoli. (See also CRA 2(7): #1325, 1964.)

65-1987 THE PRODUCTION OF TUMORS IN HAMSTERS FOLLOWING INOCULATION OF DEOXYRIBONUCLEIC ACID EXTRACTED FROM CELLS INFECTED WITH SV40 VIRUS. (Fr.) Boiron, M. (Inst. Leukemia Res., Saint Louis Hosp., Paris), J. P. Lévy and M. Thomas. Ann. Inst. Pasteur (Paris) 108(3): 298-305, 1965.

Newborn hamsters (age 1-3 days) were inj. s.c. with a DNA extract (0.15 ml/animal) extracted from monkey kidney cells (MKC) in tissue cultures collected 8 days after infection with SV40 virus (strain PA57). Tumors developed in 23/60 (38%) after 168-517 (av. 244) days. The same DNA preparations inoc. in MKC cultures induced a CPE which was characteristic of the SV40 infection. The infectious power in vitro and the carcinogenic activity in vivo of the SV40 DNA extracts were suppressed after incub. with DNase but remained intact after incub. with an immune anti-SV40 serum. Histologically, the tumors were sarcomas. Anti-SV40 antibodies were not found in animals inoc. with the SV40 DNA. Results were negative when attempts were made to isolate SV40 from the tumors or their tissue cultures. However, SV40 DNA-induced tumors contained a specific antigen as demonstrated by their failure to grow in 2-month-old hamsters previously infected with SV40. (For similar studies with polyoma virus see CRA 2(8):#1532, 1964.)

65-1988 INTERACTION BETWEEN MESOCRICETUS AURATUS CELLS AND ADENOVIRUS 12. I. CHROMOSOMAL STUDY. (Fr.) Cassingena, R. (Dept. Virol., Inst. Cancer Res., Villejuif/Seine, France) and P. Tournier. Ann. Inst. Pasteur (Paris) 108(3):277-297, 1965.

The infection with adenovirus 12 (A-12; Rosen strain) of primary tissue cultures of normal embryonic hamster cells resulted in chromosome abnormalities (52% of pseudodiploid mitoses, of which 76.9% contained an abnormal submedian metacentric chromosome associated with an abnormal telocentric) which appeared during the 24 hr. following the infection. These abnormalities were absent or present in only a few A-12-induced primary tumors examined immediately after their removal from the hamster but were found frequently in similar tumors after several passages in vitro. Hamster tumors induced by A-12 were essentially diploid but their modal number shifted toward the hypotriploid region during passage in vitro. It was concluded that there was no relationship between the chromosome ab-

normalities and the development of malignancy but that the tumor cells with abnormal chromosomes had selective advantages in their growth in tissue cultures.

65-1989 MOLONEY VIRUS--INDUCED LEUKEMIAS OF MICE: MEASUREMENT IN VITRO OF SPECIFIC ANTIGEN. (E.) Haughton, G. (Dept. Tumor Biol., Karolinska Inst., Stockholm, Sweden). Science 147:506-507, 1965.

Using a cytotoxic technic developed by Wigzell, and applied by the author to the Moloney tumor-specific system, the antigen specific for the Moloney tumor (an ascites lymphoma induced by Moloney virus in strain A or C3H mice) was measured. In this technic, the target cells are labeled with $\text{Na}_2^{51}\text{CrO}_4$; after treatment of the cells with antibody and complement, cell death was assessed by measuring the Cr^{51} which was released into the supernatant.

65-1990 ONCOGENICITY, VIRAL SENSITIVITY AND CYTOGENETIC CHARACTERISTICS OF HAMSTER CELL LINES TRANSFORMED BY SV40 VIRUS. (Fr.) Dubreuil, R. (Inst. Microbiol., U. Montreal, Canada), G. Lussier, V. Pavilanis, P. Marois and E. DiFranco. Rev. Canad. Biol. 23(3):303-322, 1964.

Five continuous cell lines were established in vitro: 1/5 (RHa3-T) was derived from the in vitro transformation of a hamster kidney cell culture infected with SV40; 4/5 (CH4, CH3, CH3-T and CH3-P) were derived from tumors induced in the hamster by the inj. of SV40. Transplantation of cells by s.c. or i.p. inj. at various conc. into 4-6-week-old golden hamsters indicated the following degrees of oncogenicity: highest in CH4 (minimum conc.; tumor appearance <8 wk.); less for CH3-P; least for RHa3-T, CH3-T and CH3 (min. conc. needed = 1,000,000 cells). The cell lines showed different degrees of sensitivity to various viruses and presented differences in morphology and chromosome composition.

65-1991 SUCCESSIVE TRANSFORMATIONS OF AN ESTABLISHED CELL LINE BY POLYOMA VIRUS AND SV40. (E.) Todaro, G. J. (Dept. Path., New York U. Sch. Med., N. Y.) and H. Green. Science 147:513-514, 1965.

Two different clonally isolated polyoma virus-transformed mouse fibroblast (3T3) lines, PY-3T3-31 and PY-3T3-11 (transformed in the presence and absence of 5-iodo-2'-deoxyuridine), when infected with SV40 (strain 776) for 3 hr. gave rise to cells with properties characteristic of SV40-transformed cells. The frequency of transformation, however, was considerably reduced compared to that of the parent 3T3 cell line. (See also CRA 1(12):#2144; and ibid., 2(4):#728, 1964.)

See also abstract nos.: 1688, 1689, 1690, 1691, 1692, 1699, 1700, 1707, 1708, 1710, 1716, 1720, 1762, 1921

EPIDEMIOLOGY AND BIOMETRY

65-1992 INTRAEPITHELIAL CARCINOMA OF THE CERVIX IN PREGNANCY. (E.) Boutselis, J. G. (Dept. Obstet. Gynec., Ohio State U. Coll. Med., Columbus) and J. C. Ullery. *Trans. Am. Gynec. Assn.* 87:33-49, 1964.

Among a total of 62,740 deliveries at the Ohio State University Hospital between 1940-62, there were 69 cases (0.11%) of cervical carcinoma *in situ* and 59 cases (0.09%) of invasive squamous cell carcinoma. Among a total of 35,466 gynecologic pts. observed during the same period, 50 (1%) had intraepithelial cervical carcinoma and 1,570 (4.1%) had invasive carcinoma. These figures indicate a significant decrease in the occurrence of invasive carcinoma and a corresponding increase in the diagnosis of carcinoma *in situ*, probably due to improved diagnostic methods. Of 69 pts. with intraepithelial carcinoma, 42 (60.8%) were Negro. No Jewish pts. with cervical carcinoma *in situ* were encountered. The majority of pts. were Protestant, married, and para 1 to III.

65-1993 THE ETHNOLOGIC AND ENDOCRINOLOGICAL ASPECTS OF BREAST CANCER AND CYSTIC MASTOPATHY IN ISRAEL. (E.) Bertini, B. (Labour Sick Fund Zamenhof Clin., Tel Aviv, Israel) and A. Ber. *Cancer* 17(4):438-449, 1964.

After a review of the literature (33 references), the authors report a study done on 833 women, of whom 428 had breast disease (298 cystic mastopathy, 130 breast cancer). The women represented 5 ethnic groups (immigrants from Yemen, Iraq, other Asian countries, North Africa, Europe, and U. S., as well as Israeli-born women of different ethnic groups) and they were studied from the ethnologic and endocrinologic points of view. The incidence of mammary cancer was high among immigrants of European and American origin and very low among immigrants from Eastern countries, particularly among Yemenite women. No marked differences were found between Israeli-born women of different ethnic groups. These findings confirm the theory that environmental factors play an important role in mammary carcinogenesis. Hormonal imbalance was more pronounced among European and American women than among those from Oriental countries, but no characteristic hormonal disturbances were detected in pts. with breast diseases except for a tendency toward hypergonadism. The highest incidence of mammary cancer was in the 40-54 yr. age group.

65-1994 EPIDEMIOLOGIC DATA ON MALIGNANT NEOPLASMS IN POLAND WITH PARTICULAR CONSIDERATION OF PULMONARY CANCER IN THE YEARS 1956-1961. (Pol.) Koszarowski, T. (Inst. Oncol., Warsaw, Poland), H. Gadowska and Z. Drożdżewska. *Nowotwory* 14(4):375-385, 1964.

In 1961, the index (per 100,000 of the general population) of morbidity due to malignancies was 120.7 with 134.9 for women and 105.5 for men; index of mortality was 98.1 for men and 96.5 for women. During 1959-61, respiratory cancer ranked third in frequency; since 1959 it ranks fifth and constitutes about 7% of all neoplasms. Comparison of 1956 and 1961 shows that lung cancer has tripled while all other malignancies have doubled. Deaths due to pulmonary cancer are increasing and rank second after gastric carcinoma deaths. The male:female ratio is 5:1. In men, frequency is highest in the age group 50-59; in women it is most frequent in age group 60-69. The urban population shows a morbidity of more than 60%, which is double that of the rural population. However, only 55% of rural death certificates are issued by physicians. The coefficient of mortality due to respiratory tract plus pulmonary malignancies was 3.7/100,000 in 1951, whereas in 1961 it was 9.8/100,000 for pulmonary cancer alone. Occupational exposure to carcinogens (no details) and more widespread tobacco smoking among men are mentioned as causative factors.

65-1995 DISTRIBUTION OF THE ABO BLOOD GROUPS IN PATIENTS WITH UTERINE CANCER. (Pol.) Mogielnicki, W. (Dept. Gynec. Oncol., Inst. Oncol., Warsaw, Poland) and L. Tarłowska. *Nowotwory* 14(4):335-340, 1964.

Among 1207 pts. with uterine cervix cancer (UCC), blood Group O was less frequent and Group A more frequent than among 3409 normal female subjects. The risk of developing UCC in Group A women was found to be 24% greater than that among women of Group O, and 20% greater than among women of Groups O, B, and AB. No statistical differences were found in the distribution of blood groups in various age groups of pts. with UCC. The same tendency was noted for the O and A frequency of 268 pts. with cancer of the uterine body.

65-1996 PATTERNS OF LEUKAEMIA IN ISRAEL. (E.) Kallner, G. *Path. Microbiol. (Basel)* 27(5):666-670, 1964.

A statistical-epidemiologic study of leukemia incidence in Israel showed a very great increase among the young during a very short time. For "Oriental" stock subjects (immigrants from North Africa or Asia) in the age group 0-9 yr. the leukemia (and related cancers) mortality rate per 100,000 was 5.4 for 1950-54 and 10.6 for 1958-61. Almost all of these had been brought to Israel after 1952, and almost all had been treated with X-rays for ringworm of the scalp. Leukemia among children of Occidental stock born abroad decreased by 24% during the same period; among native-born Israeli children, those of Oriental origin showed a 28% increase, those of

Occidental origin a 22% increase. At older ages (45-54 and 65+) leukemia incidence in Israel is very high; 66% is lymphatic. It is emphasized that the data should be interpreted cautiously, because the numbers are small.

65-1997 MALIGNANT NEOPLASMS IN THE LUGANSK REGION AND ORGANIZATION OF MEASURES IN COMBATING THEM. (Rus.) Lazarev, I. R. Tr. Khar'kovsk. Gosud. Med. Inst. 59:253-258, 1963.

In the Lugansk region of the USSR, which includes both agricultural and industrial (coal, chemicals, metallurgy) areas, the morbidity (per 10,000 population) due to malignant tumors (MMT) in the period from 1953-59 increased from 10 to 11 (for males (M) from 7.8 to 9.2; for females (F) from 11.8 to 12.7). The MMT was significantly higher in F than in M. MMT was higher in rural people up to age 49, was similar to urban people at age 50-59 and at age 60 and above it was lower than that of urban individuals. In cities and villages, MMT of F was higher than that of M at age up to 49 yr. while thereafter MMT of M was higher. In cities, MMT in M was highest at age 70 or more yr.; in F in cities and M in villages, an increase in MMT was found up to age 60-69 yr., while at age 70 yr. or more it decreased. In villages, MMT among F increased only up to age 50-59 yr. In cities or villages the most frequently affected organs among M were stomach, lung, lip, and skin; among F most frequently affected sites were uterus, stomach, skin, breast and lung.

65-1998 EPIDEMIOLOGICAL OBSERVATIONS ON MORTALITY DUE TO STOMACH CANCER IN KURUME CITY. (Jap.) Okano, T. (Dept. Hyg., Kurume U. Sch. Med., Japan), H. Esaki, S. Noge, Y. Arimatsu and T. Shiki. Kurume Igakki Zasshi (J. Kurume Med. Assn.) 28(1):108-113, 1965.

In an analysis of 678 stomach cancer deaths during the last 13 yr., the yearly mortality among females was slightly increased while the rate in males was rather constant. In comparison with the corrected death rate for the whole nation, the rate for males was a little lower, that for females a little higher. Incidence increased up to age 75; after age 40 the rate was significantly higher in males than in females. The rate was significantly higher in 4 school districts which were located mainly in a new agricultural area. Both in hospitals and in private clinics the death rate is gradually increasing in Kurume.

65-1999 FACTOR ANALYSIS OF MORTALITY FROM CANCER OF THE STOMACH. (Jap.) Matufuji, H. Igaku To Seibutsugaku (Med. Biol.) 70(2):100-103, 1965.

In a review (6 references) of factors affecting

mortality from cancer of the stomach, it appears that higher temperature (4 seasons), high intake of protein, alcohol and calcium are correlated with lower mortality. A high population density, high intake of fat and calories are also correlated with a lower mortality.

65-2000 WHO EPIDEMIOLOGICAL AND VITAL STATISTICS REPORT. (E.) Epidem. Vital Statist. Rep. 18(2):57-96, 1965.

A report on the annual rate of mortality per 100,000 population for 1952-1960 from malignant neoplasm of the buccal cavity and pharynx according to country, and according to site of neoplasm, age and sex of patient, as well as country, for the yr. 1961-62.

65-2001 MORTALITY IN SWEDEN. (E.) Larsson, T. (Inst. Med. Genet., U. Uppsala, Sweden). Acta Genet. (Basel) 15(Suppl.):1-143, 1965.

A compilation of mortality data from Sweden with a discussion of demographic changes in relation to social evolution. Included are statistics on mortality from lung cancer by sex and age for each year from 1956 to 1961, and the annual death rate from neoplasms by mo. for 1951-55, by sex, domicile and age for 1956-60, and by urban or rural domicile for the same period. A detailed presentation of data on deaths from neoplasms in certain areas (by county) for 1951-61 as well as from selected causes, including neoplasms in selected sites, arranged by sex and domicile, accompanies a discussion of changes in the pattern of mortality and its relation to broader social problems.

65-2002 STUDIES ON THE RELATIONSHIP BETWEEN STOMACH CANCER AND BLOOD GROUPS. I. ON THE ABO BLOOD GROUP FREQUENCIES IN CASES OF STOMACH CANCER. (Jap.) Sato, T. (Dept. Forensic Med., Hirosaki U. Sch. Med., Japan). Hirosaki Igaku (Hirosaki Med. J.) 15(3):464-470, 1963.

Compared to distribution in a normal population, there were no significant differences in the ABO blood groups of 968 pts. with various carcinomas of the digestive system which were collected from the 5 principal hospitals in Aomori Prefecture. There also were no significant differences when the pts. were analyzed, according to sex, 6 age groups or 4 tumor sites. Carcinoma sites included 725 stomach, 102 rectum, 24 esophagus, 117 pancreas and biliary tract. (See also the following abstract.)

65-2003 STUDIES ON THE RELATIONSHIP BETWEEN STOMACH CANCER AND BLOOD GROUPS. II. ON THE BLOOD GROUP ACTIVITY OF THE STOMACH CANCER TISSUES. (Jap.) Sato, T. (Dept. Forensic Med., Hirosaki U. Sch. Med., Japan). Hirosaki Igaku (Hirosaki Med. J.) 15(3):471-483, 1963.

An attempt at the elucidation of possible correlations of the blood type activity (as measured by an agglutination inhibition test) in various sites or various layers of the digestive wall, to the incidences of carcinoma of the stomach in various sites was reported. The cases used in this study included 61 stomach carcinoma, 3 rectal carcinoma, 25 gastric ulcer, 16 normal stomach, and 2 normal digestive tract. Although the blood type activity varied in strength with various parts of the digestive system and in the mucosa or muscular strata, no difference was detected in the blood type activity between the mucosa of the fundus and that of the antrum of the stomach. This indicates that it is unlikely that blood type activity in various sites of the stomach plays an important etiological role in the genesis of carcinoma of the stomach. (See also the preceding abstract.)

65-2004 MULTIPLE PRIMARY MALIGNANT TUMORS. (E.) Einhorn, J. (Dept. Radiol., Karolinska Hosp., Stockholm, Sweden) and P. Jakobsson. Cancer 17(11):1437-1444, 1964.

Of 1675 pts. with carcinoma of the lip admitted to the department from 1910-1950 and followed to death or to 1960, 226 had a new primary neoplasm elsewhere than on the lip; 62 of these had 82 malignant skin tumors and 164 had 171 malignant tumors of other organs. In 0.7% of the cases, another primary neoplasm was found simultaneously with carcinoma of the lip, while during the subsequent follow-up period, a new primary neoplasm was found in about 0.9% of the pts. each yr.; 30 yr. after the lip cancer had been treated, the cumulative incidence had risen to 27.4%, excluding lip and skin tumors. The cumulative incidence of new primary neoplasms among women was more than 2x that among men and this was due largely to the higher morbidity of oral and throat tumors among women. The incidence rate for 309 men in this series aged 25-50 (av. 1.06% per yr.) was 16 times higher than that for all Swedish males aged 25-55 (1959 Swedish Cancer Registry). However, in older groups the incidence of multiple tumors was ascribable to chance. The only major carcinogenic factor responsible for multiple malignant tumors observed in the series was Plummer-Vinson's syndrome which resulted in a high incidence of malignant epithelial tumors in the upper digestive tract in women.

65-2005 DYSPLASIA OF THE UTERINE CERVIX. INCIDENCE OF REGRESSION, RECURRENCE, AND CANCER. (E.) Stern, E. (Sch. Public Health, U. California, Los Angeles) and P. M. Neely. Cancer 17(4):508-512, 1964.

Of 130 women with dysplasia of the cervix kept under observation for 6 mo.-9 yr. (mean follow-up, 2.05 yr.), the incidence rate for *in situ* cancer of the cervix was 64/1000/yr., while the same

rate for women without dysplasia was 0.04/1000/yr. There was a significantly higher rate of progressions from dysplasia to cancer in women under 45 yr. of age as compared to women 45 yr. and over. Of the 130 women, there were 15 cases of progression to cancer among 219 interval scores (1.7 scores/pt.), for a progression rate of 6.8%/yr. A previous finding that approx. 85% of the total cancers originating in clinic returnees occurred in approx. 1% of the subjects with dysplasia indicates that a majority of cases of cancer of the cervix originates in pts. with dysplasia of the cervix.

65-2006 CANCER OF THE LUNG AND MOUTH IN SEVENTH-DAY ADVENTISTS. PRELIMINARY REPORT ON A POPULATION STUDY. (E.) Lemon, F. R. (Dept. Prev. Med., Loma Linda U. Sch. Med., Cal.), R. T. Walden and R. W. Woods. Cancer 17(4):486-497, 1964.

In a study among California Seventh-Day Adventists (SDA) during 1955-1959, deaths from all causes and all cancers were 65% and 70%, resp., of the numbers expected among the male SDA and 75% and 80%, resp., of the numbers expected among the female SDA. Of the 3481 deaths (3451 with death certificates) reported over that period, 608 (224 men, 384 women) died from cancer and the frequency distribution by site for the men and women was as follows: miscellaneous, 29% and 29.6%; intestine and rectum, 14.7% and 16.7%; prostate and other genital areas, 13.4% and --; breast, -- and 17.7%; stomach, 11.2% and 5.7%; pancreas and liver, 10.3% and 10.7%; lymphatic and hematic, 9.4% and 9.1%; urinary tract, 5.8% and 2.9%; lung, 5.8% and 1.6%; bucca and pharynx, 0.4% and 0.5%; uterine cervix, -- and 5.5%, resp. In unpublished California Public Health Department records on 52,071 men and 46,540 women who died from cancer, lung cancer ranked first (disregarding miscellaneous sites) as the cause of death (13.8%) in the men and breast cancer (20.5%) in the women, while cancers of the bucca and pharynx comprised 3.5% and 1.3% of the California men and women, resp. Pancreatic and liver cancer was more frequent in SDA than in non-SDA. All SDA male deaths from epidermoid or anaplastic lung cancer occurred among individuals who were recent adult converts (6 of 7 within 5 yr. of death) and all of whom had also been regular cigarette smokers of long duration.

65-2007 INCIDENCE AND TOPOGRAPHY OF CANCER AMONG FILIPINOS: ANALYSIS OF CASES SEEN IN FOUR GENERAL HOSPITALS IN MANILA FROM 1941 TO 1961. (E.) Tolentino, A. D., Jr. (North Gen. Hosp., Quezon City, The Philippines). Philipp. J. Cancer 6(1):674-684, 1964.

65-2008 ADNEXAL TUMORS OF THE SKIN: OBSERVATIONS ON 50 CASES WITH SPECIAL REFERENCE TO HISTOPATHOLOGY. (E.) Sirsat, M. V.

(Tata Mem. Hosp., Bombay, India) and P. Kail.
J. Postgrad. Med. 10(4):137-155, 1964.

65-2009 HEALTH PROPAGANDA AGAINST SMOKING. I.
THE MEDICAL DEBATE ON SMOKING AND DIS-
SEASE. (Sw.) Bjurulf, P. (Inst. Social Med.,
U. Lund, Sweden). Socialmed. T. 40:280-285, 1963.

65-2010 HEALTH PROPAGANDA AGAINST SMOKING. II.
THE SMOKING HABIT IN RELATION TO AGE,
INCOME AND EDUCATION. (Sw.) Bjurulf, P. (Inst.
Social Med., U. Lund, Sweden). Socialmed. T.
40:344-352, 1963.

65-2011 HEALTH PROPAGANDA AGAINST SMOKING.
III. KNOWLEDGE OF HEALTH INFORMATION
CONCERNING ASSOCIATION BETWEEN SMOKING AND CANCER.
(Sw.) Bjurulf, P. (Inst. Social Med., U. Lund,
Sweden). Socialmed. T. 40:385-396, 1963.

65-2012 SOME CHARACTERISTICS OF MULTIPLE PRIMARY
CANCERS. (E.) Mersheimer, W. L. (Dept.
Surg., New York Coll. Med., N. Y.), A. Ringel and
H. Eisenberg. Ann. N. Y. Acad. Sci. 114(2):
896-921, 1964.

65-2013 INCIDENCE AND SIGNIFICANCE OF MULTIPLE
PRIMARY MALIGNANT NEOPLASMS. (E.)
Moertel, C. G. (Mayo Clin., Rochester, Minn.).
Ann. N. Y. Acad. Sci. 114(2):886-895, 1964.

65-2014 A STUDY OF CYSTOSARCOMA PHYLLODES. (E.)
Treves, N. (Mem. Hosp. Cancer Allied
Dis., New York, N. Y.). Ann. N. Y. Acad. Sci.
114(2):922-936, 1964.

65-2015 CANCER IN THE AGED. (E.) Cutler, S. J.
(NCI, Bethesda) and H. Eisenberg. Ann.
N. Y. Acad. Sci. 114(2):771-781, 1964.

65-2016 BENIGN TUMORS OF THE LIP AND THEIR
TRANSFORMATIONS. (Por.)
De Pádua Bertelli, A. (Central Inst., Anti-Cancer
Assn., Sao Paulo, Brazil). Rev. Brasil. Cir.
49(1):41-50, 1965.

A report on 341 cases.

65-2017 STATISTICAL AND ANATOMOCLINICAL ASPECTS
OF CARCINOMA OF THE LARGE INTESTINE. A
STUDY OF 129 CASES. (Sp.) Cavallo, T. (Dept.
Path. Anat., U. Sao Paulo Sch. Med., Brazil),

B. Lichewitz, F. Queiroz and M. R. Montenegro.
Rev. Hosp. Clin. Fac. Med. S. Paulo 19(6):328-336,
1964.

65-2018 STUDIES ON THE RELATION BETWEEN ABO
BLOOD GROUPS AND GASTRIC CARCINOMA. I.
RELATION OF BLOOD GROUPS TO DIFFERENT TYPES OF
TUMOUR. (E.) Eklund, A. E. (Dept. Surg., Karo-
linska Inst. Sch. Med., Stockholm, Sweden). Acta
Chir. Scand. 129(2):211-218, 1965.

65-2019 STUDIES ON THE RELATION BETWEEN ABO
BLOOD GROUPS AND GASTRIC CARCINOMA. II.
BLOOD GROUPS AND GASTRIC ACIDITY. (E.) Eklund,
A. E. (Dept. Surg., Karolinska Inst. Sch. Med.,
Stockholm, Sweden). Acta Chir. Scand. 129(2):
219-222, 1965.

65-2020 PRIMARY CARCINOMA OF THE LIVER. A
PATHOLOGIC AND CLINICAL STUDY OF 100
CASES. (E.) Ervasti, J. (2nd Dept. Surg.,
U. Helsinki Cent. Hosp., Finland). Acta Chir.
Scand. (Suppl. 334):1-65, 1964.

65-2021 FAMILIAL FACTOR IN MALIGNANT MELANOMA.
(E.) Turkington, R. W. (Duke Hosp.,
Durham, N. C.). J.A.M.A. 192(2):77-82, 1965.

Case reports.

65-2022 SALIVARY GLAND TUMOURS IN EGYPT AND NON-
WESTERN COUNTRIES. (E.) El-Gazayerli,
M. M. (Dept. Path., Duke U. Med. Ctr., Durham,
N. C.) and A. S. Abdel-Aziz. Brit. J. Cancer
18(4):649-654, 1964.

65-2023 BONE TUMOURS IN UGANDA AFRICANS. (E.)
Dodge, O. G. (Dept. Path., Sheffield U.,
England). Brit. J. Cancer 18(4):627-633, 1964.

65-2024 NASOPHARYNGEAL CANCER IN KENYA. PA-
THOLOGY. (E.) Linsell, C. A. (Med. Res
Lab., Nairobi, Kenya). Brit. J. Cancer 18(1):49-5
1964.

65-2025 NASOPHARYNGEAL CANCER IN KENYA. RADIO-
LOGICAL APPEARANCES. (E.) Whittaker,
L. R. (Dept. Radiol., King George VI Hosp., Nairobi
Kenya). Brit. J. Cancer 18(1):44-48, 1964.

65-2026 CANCER IN POLAND IN 1959. (E.)
Staszewski, J. (Inst. Oncol., Gliwice,
Poland). Brit. J. Cancer 18(1):1-13, 1964.

See also abstract nos.: 1681, 1684, 1803, 1804

MISCELLANEOUS

65-2027 THE INCIDENCE OF PATHOLOGIC ABNORMALITIES, INCLUDING SPONTANEOUS LYMPHOMAS, IN A LABORATORY STOCK OF XENOPUS (THE SOUTH AFRICAN CLAWED TOAD). (E.) Balls, M. Virus Lab., U. California, Berkeley). Cancer Res. 25(1):3-6, 1965.

The spontaneous pathologic abnormalities occurring in a large laboratory colony of *Xenopus* since 1960 included granulomas, hematomas, hamartomas, cysts, hydrops disease, paralysis and 81 cases of lymphosarcoma. The lymphosarcomas commonly affected the liver, spleen and kidneys but so metastasized to other organs. The first cases of lymphosarcoma were in miscellaneous adult animals, while the later cases tended to be in juvenile *Xenopus*, especially those in experimental families. (See also CRA 3(7):#1809, 1965.)

65-2028 CHROMOSOME STUDIES OF TWO PATIENTS WITH DOWN'S SYNDROME (MONGOLISM) AND LEUKEMIA. (Dan.) Mikkelsen, M. (Dept. Genet., Copenhagen, Denmark), G.S. Petersen and Bøgh. Ugeskr. Laeg. 126(40):1365-1368, 1964.

In 2 mongoloid infants who developed acute leukemia, chromosome studies of cells derived from skin fibroblasts of both pts. and from the bone marrow and circulating blood of one pt. showed changes typically associated with Down's syndrome. These changes are discussed in some detail.

65-2029 DOES CANCER REQUIRE A PREDISPOSING "GROUND"? I. STEPS IN THE DEVELOPMENT OF CANCER IN RESPONSE TO IRRITATION BY FOREIGN BODIES. (Dut.) Hollander, C. F. (Dept. Path., Leiden, The Netherlands). Geneesk. Gids 42(20):419-422, 1964.

See CRA 1(1):#38 and #39, 1963.

65-2030 DOES CANCER REQUIRE A PREDISPOSING "GROUND?" (CONCLUSION.) GASTRIC CARCINOMAS IN PATIENTS PREVIOUSLY OPERATED FOR BENIGN ULCERS. (Dut.) Imhof, J. W. (U. Hosp., Utrecht, The Netherlands). Geneesk. Gids 42(22):461-466, 1964.

Among a total of 1,000 pts. studied by gastroscopy, 120 had undergone previous gastric resection and 13/120 had developed carcinomas postoperatively in the remaining portion 4-25 yr. after surgery for benign ulcer (10/13, peptic). Examination of 90 biopsies of previously resected stomachs showed approx. 20 with normal gastric mucosa, 45 exhibited chronic, atrophic gastritis involving the entire mucosal surface and approx. 5% showed a severe degree of atrophy, frequently accompanied by regenerative metaplasia. The possibility is suggested that chronic atrophic

gastritis may have a causal relationship to gastric carcinoma.

65-2031 HERPES ZOSTER AND VARICELLA. TWO PATIENTS WITH GENERALIZED HERPES ZOSTER AND CHRONIC LYMPHATIC LEUKEMIA. (Sw.) Recht, L. (Med. Clin., Cent. Hosp., Angelholm, Sweden). Svensk. Lakartidn. 61(40):2909-2915, 1964.

Report is made of the simultaneous occurrence of generalized herpes zoster and varicelliform exanthemata in 2 adult, male pts. with chronic lymphatic leukemia. In one case the leukemia was diagnosed prior to the cutaneous eruptions; in the other, the 3 disorders were diagnosed simultaneously.

65-2032 THE RELATIONSHIP OF CHRONIC ULCERATION OF THE ILEOCECAL JUNCTION TO THE DEVELOPMENT OF RETICULOENDOTHELIAL TUMORS IN C₃H MICE. (E.) Pilgrim, H. I. (Dept. Surg., U. Utah Coll. Med., Salt Lake City). Cancer Res. 25(1):53-65, 1965.

In C₃H/Pi and C₃Hf/Pi mice having both normal-appearing and inflamed ileocecal junctions, minute ulcers of the cecum at the entrance of the ileum were found by the use of serial section although no gross pathologic changes were noted. These ulcers were believed to be the earliest detectable lesions in the process leading to the development of plasma cell neoplasms. Also observed were a wide variety of changes ranging from chronic inflammation with a plasmacytic response to frank plasmacytoma. Gonadectomy had no effect on the incidence of ileocecal lesions and plasmacytomas.

65-2033 THE LARVAL CHARACTERISTICS AND SALIVARY GLAND CHROMOSOMES OF A TUMORIGENIC STRAIN OF *DROSOPHILA MELANOGASTER*. (E.) Rodman, T. C. (Dept. Zool., Columbia U., New York, N. Y.). J. Morph. 115(3):419-445, 1964.

Experimental studies on the tu-h strain of *D. melanogaster* have revealed the following characteristics: occurrence of melanotic tumors in the larvae; failure of pupation at the second molt; aberrant puff patterns in the salivary gland chromosomes in the third instar and gross structural alterations in these chromosomes in the larval period extended by failure of pupation. A temporal relationship is suggested between the alterations in chromosome structure and tumorigenesis in tu-h larvae.

65-2034 AN UNUSUAL WAY OF SMOKING IN THE CARIBBEAN AREA. (Dut.) Haneveld, G. T. Nederl. T. Geneesk. 108(50):2436, 1964.

In the Netherlands Antilles, where the practice is

confined to native women of the older generation, 7/17 women pts. with basal cell carcinomas of the palate (apparently developing out of long-standing leukoplakia) reported habitual smoking with the lighted end of the cigarette inside the mouth. The latent period appeared to be long; the age of the pt. group ranged from 55-90. In response to a question, the author commented that buccal cancers attributed to chewing tobacco had also been observed, but that a probable transformation of leukoplakia into carcinoma had been seen only in the presence of "inverted" smoking.

- 65-2035 ISOANTIBODIES TO HUMAN CANCER CELLS IN CANCER PATIENTS FOLLOWING CANCER HOMOTRANSPLANTS. (E.) Itoh, T. (Sloan-Kettering Inst., New York, N. Y.) and C. M. Southam. J. Immun. 93(6):926-936, 1965.

Homotransplants of human cancer cells were made in pts. with cancer of various types and in various stages of progression according to the methods previously described for healthy pts. (CRA 1(9-10):#1823, 1964). Although all pretransplantation sera gave negative tests, 23/38 recipients of tissue culture cells developed antibody at serum dilution titers of 1:10-1:40 usually within 14 days; 5/12 direct homotransplant recipients also developed antibody but the titers were only 1:5-1:10. Rejection of these cancer cell homografts in the cancer pt. was significantly delayed in about 50% of the recipients.

- 65-2036 DIFFERENCES IN THE MODE OF AGGREGATION IN CULTURES OF MALIGNANT AND NORMAL CELLS OF THE SAME ORIGIN. (Fr.) Pejsachowicz, B. (Dept. Exp. Med., Coll. France, Paris), B. Halpern, H. Febvre and G. Barski. C. R. Acad. Sci. (Paris) 259(25)(Group. 14):4891-4894, 1964.

The mode of aggregation in Eagle's medium culture was studied for two different sources of cells: (1) normal rat embryo cells (line ER1) and the same cells rendered malignant (Rothschild and Febvre line CT4) by Rous sarcoma virus and (2) mouse s.c. cells, normal (line N2) and malignant (line M6, a clone resulting from hybridization of N2 with the very malignant clone N1). Malignant cells rapidly formed multicellular, large, compact organoids, the cellular cohesion being strong; there were practically no free cells in the medium at the end of 48 hr. Normal cells remained instead isolated and dispersed through the medium; only a small number formed very small clusters which could be easily dissociated.

- 65-2037 CO-EXISTENT SEMINOMA AND TERATOMA: REPORT OF A CASE. (E.) Webb, J. N. (Western Gen. Hosp., Edinburgh, Scotland). Brit. J. Urol. 36(4):570-572, 1964.

The case history of a 43-year-old man with a seminoma and teratoma occurring in the left testicle is presented.

- 65-2038 CARCINOMA OF THE ESOPHAGUS WITH A HISTORY OF LYE INGESTION. (E.) Arrants, J. E. (Dept. Surg., U. Florida Coll. Med., Gainesville), H. Albuerne and M. J. Jurkiewicz. Am. Surg. 31(2):107-110, 1965.

A case report is presented of a 67-year-old Negro woman who ingested lye at the age of 3 yr. and since that time had occasional episodes of mild dysphagia due to chronic stricture of the esophagus. The pt. died of resultant carcinoma of the esophagus with invasion of the trachea and bronchus and metastases to the lung.

- 65-2039 THE SYNTHESIS OF NUCLEIC ACIDS IN MALIGNANT TUMOR AS MEASURED WITH IN VITRO-LABELED H^3 -THYMIDINE AND H^3 -CYTIDINE. I. (Jap. Tanaka, T. (Dept. Radiol., Yokohama Munic. Col. Med., Japan). Nichidai Igaku Zasshi (Nippon Uni. Med. J.) 22(11):881-882, 1963.

In human malignant tumor (no details), in vitro labeling of DNA with H^3 -thymidine and RNA with H^3 -cytidine revealed that H^3 -thymidine was not labeled at uniformly high rates, while H^3 -cytidine was labeled at high rates. This was interpreted as indicating that DNA is only incorporated into tumor cells in the synthetic phase only, while RNA is incorporated actively in all phases including the interphase of synthesis. The synthesis of DNA was marked in histologically undifferentiated tumor cells and in areas where proliferation of tumor cells was active.

- 65-2040 CYTOGENETIC STUDIES IN EOSINOPHILIC LEUKEMIA. THE RELATIONSHIP OF EOSINOPHILIC LEUKEMIA AND CHRONIC MYELOCYTIC LEUKEMIA. (E.) Goh, K.-O. (Dept. Med., U. Rochester Sch. Med., N. Y.), S. N. Swisher and C. A. Rosenberg. Ann. Intern. Med. 62(1):80-86, 1965.

Cytogenetic studies in 2 men (aged 43 and 46 yr. with eosinophilic leukemia revealed the presence of a very large acrocentric chromosome in 4 metaphases from peripheral blood of 1 case and in 6 metaphases from bone marrow of the other case. The Ph^1 chromosome was absent in both. These findings suggest that eosinophilic leukemia is not a variant of chronic myelocytic leukemia in which eosinophilic proliferation happens to be most prominent, but rather may be a distinctive malignant myeloproliferative disorder.

- 65-2041 DNA SYNTHESIS IN PLANT TUMOR CELLS. (I) Rasch, E. M. (Dept. Biol., Marquette U. Milwaukee, Wis.). Exp. Cell Res. 36(3):475-486, 1964.

In a radioautographic study utilizing tritiated thymidine, DNA synthesis was high in plant tissue 2 days after wounding or inoc. with crown gall bacteria. After 5 days, increased DNA was seen only in tumor tissue. DNA synthesis time was 50%-60% of that during interphase.

- 65-2042 LOCALIZATION AND MALIGNANCY OF SO-CALLED ABRIKOSOFF-TUMORS. (Ger.) Haag, W. (Dept. Surg., Cent. Hosp., Bremen-Nord, Germany). Med. Welt (16):827, 838-841, 1965.
- 65-2043 OUR CHANGED ATTITUDE IN THE MANAGEMENT OF HYDATIDIFORM MOLE IN 196 CASES ADMITTED TO THE PHILIPPINE GENERAL HOSPITAL FROM APRIL 10, 1959 TO MARCH 27, 1963. (E.) Acosta-Sison, H. (U. Philippines Coll. Med., Quezon City). Philipp. J. Cancer 6(1):708-714, 1964.
- 65-2044 IMMUNO-MORPHOLOGICAL IMPLICATIONS IN THE MECHANISM OF CARCINOGENESIS. (E.) Cajano, A. (1st. Dept. Med., Pascale Found., Tumor Inst., Naples, Italy). Philipp. J. Cancer 5(4):605-610, 1963.
- 65-2045 SIMULTANEOUS OCCURRENCE OF IRIDAL METASTASIZING PAPILLARY CYSTADENOMA AND HETEROLATERAL PALPEBRAL RECURRING TUMOUR OF IDENTICAL STRUCTURE. (E.) Eröss, S. (Dept. Ophthalmol., Janos Municip. Hosp., Budapest, Hungary), T. Orbán, A. Kálló and J. Hanisch. Ophthalmologica (Basel) 149(1):27-36, 1965.
- 65-2046 MYELOBLASTOMA PRECEDING BLOOD AND MARROW EVIDENCE OF ACUTE LEUKEMIA. (E.) Comings, D. E. (Madigan General Hosp., Tacoma, Wash.), A. W. Fayen and P. Carter. Cancer 18(2):253-258, 1965.
- A case report.
- 65-2047 CARCINOMA WITHIN SOLITARY RENAL CYSTS. (E.) Khorsand, D. (Dept. Urol., U. Minnesota, Minneapolis). J. Urol. 93(4):440-444, 1965.
- Two case reports.
- 65-2048 THE ANTIGENS OF CANCEROUS TUMORS IN MAN. (E.) Kosyakov, P. N. (D. I. Ivanovsky Inst. Virol., USSR Acad. Med. Sci., Moscow) and V. S. Korosteleva. Philipp. J. Cancer 5(4):636-642, 1963.
- 65-2049 THE STUDY OF SPECIFIC HUMAN GASTRIC CANCER ANTIGENS. (E.) Aveninova, Z. A. (Dept. Immunol., Gamaleya Inst. Epidemiol. Microbiol., Moscow), L. A. Ludogovskya and V. S. Tsvetkov. Philipp. J. Cancer 5(4):632-635, 1963.
- 65-2050 CANCER IN INFANCY AND CHILDHOOD. (E.) Dargeon, H. W. (Sloan-Kettering Inst., New York, N. Y.). Ann. N. Y. Acad. Sci. 114(2):767-770, 1964.
- Case reports of familial occurrence.
- 65-2051 FOURFOLD PRIMARY CANCER MULTIPLICITY. (Ger.) Bartual Pastor, J. (Dept. Ear Nose Throat, U. Wurzburg, Germany). Arch. Ohr. Nas. Kehlkopfheilk. 184(4):330-336, 1965.
- 65-2052 THE PRESENT STATUS OF THE IMMUNOLOGICAL THEORY OF CANCER. (E.) Green, H. N. (Dept. Exp. Path., U. Leeds Sch. Med., England). Philipp. J. Cancer 5(4):611-614, 1963.
- 65-2053 CYTOLOGIC COMPARISONS. IV. CHANGES OF BLOOD GROUPS IN THE LEUKEMIAS. (Fr.) Bernard, J. (Saint Louis Hosp., Paris), M. Bessis, A. Bussard, J. Ducos, J. De Grouchy, J. Lejeune, C. Salmon, M. Seligmann and R. Wurmser. Nouv. Rev. Franc. Hemat. 5(2):291-308, 1965.
- 65-2054 TERATOCARCINOMA OF THE OVARY ASSOCIATED WITH APLASIA OF THE UTERUS AND VAGINA. REPORT OF A CASE. (E.) Graudenz, M. G. (Dept. Gynec., Inst. Path., Porto Alegre, Brazil). Obstet. Gynec. 25(5):741-742, 1965.
- 65-2055 SUBACUTE CORTICAL CEREBELLAR DEGENERATION ASSOCIATED WITH OCCULT CARCINOMA. (E.) Owings, R. H. (Dept. Path., Bothwell Mem. Hosp., Sedalia, Kan.), T. S. Hopkins and J. J. Kepes. Missouri Med. 62(5):382-385, 1965.
- A case report.
- 65-2056 AN UNUSUAL MORBID ASSOCIATION: CHRONIC LYMPHATIC LEUKEMIA AND DUHRING-BROCQ'S DERMATITIS. (It.) Gaddoni, G. (Inst. Clin. Derm., U. Bologna, Italy). Arch. Ital. Derm. Vener. 33(1):22-32, 1964.
- A case report.
- 65-2057 A CASE OF ORBITAL MENINGIOMA ASSOCIATED WITH SARCOIDOSIS OF THE SATELLITE LYMPH NODES. (It.) Pannarale, C. (Eye Clin., U. Bari, Italy) and E. Ragnetti. Minerva Oftal. 6(4):130-137, 1964.
- 65-2058 FIBRO-OSTEOSARCOMA OF THE JAW IN A PATIENT WITH LICHTEINSTEIN'S DISEASE. (Sp.) Pilheu, F. and G. Del Soldato. Soc. Argent. Ciruj. (Bol.-Trab.) 25(9):279-282, 1964.
- A case report.
- 65-2059 RECTAL CANCER AND GENITAL TUBERCULOSIS. (It.) Calzoni, D. (1st Dept. Surg., Maggiore Hosp. della Carita, Novara, Italy). Osped. Maggiore Novara 41(5):425-435, 1964.
- A case report.

65-2060 EPITHELIOMATOUS TRANSFORMATION OF ORAL FLORID PAPILLOMATOSIS. (It.)

Sipione, S. Boll. Ist. Osp. Derm. S. Maria 3(7):60-65, 1964.

A case report.

65-2061 THE TRANSFORMATION OF LEWANDOWSKI-LUTZ EPIDERMODYPLASIA VERRUCIFORMIS INTO PRICKLE CELL EPITHELIOMA. (It.) Cavalieri, R. (Immacolata Dermopat. Inst., Rome). Cron. IDI 19(2):83-90, 1964.

A case report.

65-2062 NEOPLASMS AND THROMBOSIS. A CASE OF PULMONARY CYSTADENOCARCINOMA ASSOCIATED WITH MULTIPLE THROMBOSIS. (It.) Simeoni, S. (Inst. Oncol., U. Rome). Gior. Ital. Pat. 11(2):67-93, 1964.

A case report.

65-2063 A STUDY OF TWO CASES OF MULTIPLE CUTANEOUS LEIOMYOMA ASSOCIATED WITH UTERINE MYOFIBROMA, ONE WITH FAMILIAL CHARACTERISTICS. (It.) Voglino, A. Cron. IDI 19(2):138-146, 1964.

65-2064 TRAUMAS AND HEMOPATHIES. MYELOID SPLENOMEGALY WITH BONE MARROW HYPOPLASIA FOLLOWING A TRAUMA OF THE SPLENIC REGION. (It.) Dalli, G. C. (Inst. Occupat. Med., U. Pisa, Italy), P. Chiaverini and U. Trivella. Lavoro Um. 16(7):322-329, 1964.

A case report.

65-2065 SARCOMATOUS TRANSFORMATION OF PERITONEAL LYMPHOMA. (Fr., Abstract) Hirsch, R. Delcourt, Ernalsteen and Wilputte. Bruxelles Med. 45(8):220, 1965.

65-2066 ON A PARTICULAR MALIGNANT DEVELOPMENT OF A THYMOMA. (CLINICAL AND ANATOMICO-PATHOLOGIC STUDY.) (It.) Corso, G. F. (Inst. Gen. Clin. Surg., U. Padua, Italy), A. De Pascale and B. Zaffagnini. Chir. Pat. Sper. 11(12):1151-1176, 1963.

65-2067 FURTHER STUDIES ON ABNORMAL SERUM PROTEINS IN TUMOR-BEARING HOSTS. (E.) Bernfeld, P. (Bio-Res. Inst., Cambridge, Mass.) and J. Wan. Proc. Soc. Exp. Biol. Med. 117(3):675-681, 1964.

65-2068 CYTOGENETIC ABNORMALITIES IN CARCINOMA-IN-SITU AND DYSPLASIAS OF THE UTERINE CERVIX. (E.) Boddington, M. M. (Cytodiag. Unit,

Churchill Hosp., Oxford, England), A. I. Spriggs and M. R. Wolfendale. Brit. Med. J. 1:154-158, 1965.

Case reports.

65-2069 OBSERVATIONS ON THE NATURAL COURSE OF SKIN CANCER. (E.) Jackson, R. (Dept. Derm., Ottawa Civic Hosp., Canada). Canad. Med. Assn. J. 92(11):564-570, 1965.

A discussion with illustrative cases.

65-2070 PRESENCE OF TWO PH¹ CHROMOSOMES IN CELL FROM A PATIENT WITH CHRONIC GRANULOCYTI LEUKAEMIA. (E.) Dougan, L. (Dept. Hemat., Roy. Perth Hosp., Western Australia) and H. J. Woodliff. Nature (London) 205:405-406, 1965.

65-2071 DATA ON THE SCIENTIFIC WORK OF THE "CAS DI RISPARMIO PP.LL." INSTITUTE OF TUMOR GENETICS IN MILAN. (Fr.) Gianferrari, L. (55 Corso Venezia, Milan, Italy) and G. Morganti. Acta Un. Int. Cancr. 20(4-5):1178-1180, 1964.

A review.

65-2072 ON THE ROLE OF ISOIMMUNE REACTIONS IN TISSUE TRANSPLANTATION. (E.) Möller, G. Tryckeri Balder AB, Stockholm, 1963, 56 pp.

65-2073 A NEW CASE OF THE ASSOCIATION SCLERODERMA-TUMOR. ANATOMOCLINICAL OBSERVATION AND STUDY OF THE INTERRELATIONSHIP OF TRYPTOPHAN-NICOTINIC ACID. (It.) Portioli, R. I. (Inst. Gen. Clin. Med., U. Parma, Italy) and U. Ambanelli. Ateneo Parmense 35(6):697-711, 196

65-2074 CRANIO-ORBITAL PLASMOCYTOSARCOMA WITH A SPONTANEOUSLY REGRESSIVE COURSE. (Fr.) Quéré, M. A. (Pasteur Inst., U. Dakar Sch. Med., Senegal), R. Camain, J. Testu and D. Lamber. Ann. Oculist. (Paris) 198(1):28-38, 1965.

A case report.

65-2075 CUSHING'S SYNDROME AND CANCER OF THE PANCREAS. THE PARTICULAR ASPECTS OF PARANEOPLASTIC HYPERADRENOCORTICISM. (Fr.) Bricaire, H. (Endocrin. Res. Ctr., Cochín Hosp., Paris), R. Tourneur, J. Leprat, J. P. Luton and Yacovou. Sem. Hop. Paris 41(18):767-773, 1965.

A case report.

65-2076 HABITUAL SMOKING AMONG 19-YEAR OLD MEN IN ØSTFOLD. (Nor.) Larsen, Ø. (Inst. Hyg., U. Oslo, Norway). T. Norsk. Laegeforen. 85(5):443-448, 1965.

65-2077 MALIGNANT DEGENERATION OF CYSTIC TERATOMA OF THE OVARY. (Por.) Bafutto, M. G. (Dept. Path. Anat., Fed. U., Goiana, Brazil). Rev. Goiana Med. 10(1-2):55-62, 1964.

A case report.

65-2078 A MALIGNANT CHANGE IN A MIXED TUMOR OF THE SOFT PALATE. (Jap., E. Summary) Setoguchi, A. Jibiinkoka (Otolaryngology, Tokyo) 37(3):241-244, 1965.

A case report.

65-2079 PRIMARY MULTIPLE BRAIN TUMORS. (Jap., E. Summary) Kitamura, K. (Dept. Neurosurg., U. Tokyo Sch. Med.), N. Nakamura, H. Terao, I. Hayakawa, S. Kamano, T. Ishijima and K. Sano. No To Shinkei (Brain-Nerve) 17(2):109-117, 1965.

65-2080 FATAL COURSE OF A CASE OF MULTIPLE KERATOACANTHOMA ASSOCIATED WITH PSORIASIS FOLLOWING CANCERIZATION. (It.) Maragnani, U. (Santi Antonio Hosp., Alessandria, Italy). Minerva Med. 56(3-4):81-87, 1965.

65-2081 MALIGNANT TRANSFORMATION OF MIXED TUMORS OF THE HARD PALATE. (It.) Pototschnig, B. (S. Salvatore Civil Hosp., Pesaro, Italy). Otorinolaring. Ital. 33(2):166-173, 1964.

A case report.

65-2082 UNUSUAL DEVELOPMENT OF AN EXCEPTIONALLY EXTENSIVE CONDYLOMA ACUMINATUM. (It.) Francesconi, G. (Inst. Plast. Surg., U. Milan, Italy) and A. Maurizio. Arch. Ital. Chir. 90(4):507-515, 1964.

65-2083 OSTEOGENIC SARCOMA OF THE TIBIAL PROXIMAL EPIPHYSIS ARISING ON EXOSTOSIS. (It.) Marsano, R. (Dept. Orthoped., U. Milan, Italy). Arch. Ortop. 76(5-6):465-470, 1963.

A case report.

65-2084 IDIOPATHIC MEGA-ESOPHAGUS COMPLICATED BY CANCER. (Fr., Abstract) Darnaud, C., R. Voisin, R. Sarrazin, B. Massabie and P. Cantala. Sem. Hop. Paris 41(19):867, 1965.

A case report.

65-2085 VENEREAL PROLIFERATIONS AND CANCER OF THE PENIS. (Fr.) Harmel-Tourneur, L. and B. Kalis. Bull. Soc. Franc. Derm. Syph. 71(5):665-667, 1964.

A case report.

65-2086 DEVELOPMENT OF AN APPARENTLY BENIGN CUTANEOUS LYMPHOCYTOSIS INTO A MALIGNANT RETICULOSIS. (Fr.) Dugois, P., P. Couderc and P. Amblard. Bull. Soc. Franc. Derm. Syph. 71(5):611-612, 1964.

A case report.

65-2087 DEGENERATED SOLITARY ADENOMAS OF THE LEFT COLON OR MALIGNANT POLYPS? (Fr.) De la Vaissière, G. (Rothschild Hosp., Paris), L. Jourde and J. Loygue. Ann. Chir. 19(3-4):206-213, 1965.

A report on 4 cases.

65-2088 THE ASSOCIATION OF RETINOBLASTOMA WITH PERSISTING HYALOID ARTERY. (It.) Alfieri, G. (Eye Clin., U. Turin, Italy). Rass. Ital. Ottol. 32(1-2):55-61, 1963.

A case report.

65-2089 GASTRIC CANCER ACCOMPANIED WITH DEVELOPMENT OF MILIARY LUNG CARCINOMATOSIS IN COMBINATION WITH MILIARY LUNG TUBERCULOSIS. (Rus.) Paliichuk, N. I. and V. P. Nechiporenko. Vestn. Rentgen. Radiol. 40(1):66-67, 1965.

A case report.

65-2090 SQUAMOUS CELL EPITHELIOMA ON GRANULOMATOUS GLOSSITIS. A CONTRIBUTION TO ITS LATE PROGNOSIS. (Ger.) Hornstein, O. (Skin Clin., Dusseldorf Acad. Med., Germany). Hautarzt 16(2):90-92, 1965.

65-2091 CHROMOSOMES IN SHORT-TERM CULTURES OF LYMPHOID TISSUE FROM PATIENTS WITH RETICULOSIS. (E.) Baker, M. C. (Mount Vernon Hosp., Northwood, Middlesex, England) and N. B. Atkin. Brit. Med. J. 1:770-771, 1965.

65-2092 GOITER AND THYROID CANCER. (Sp.) Soto, R. J. and L. Rabinovich. Rev. Asoc. Med. Argent. 79(1):13-17, 1965.

Case reports.

65-2093 THE SYNDROME OF JAW CYSTS--BASAL CELL CARCINOMAS--SKELETAL ANOMALIES. CLINICAL STUDY WITH CHROMOSOMAL ANALYSES OF A FAMILY. (E.) Schønning, L. (Radium Ctr., Copenhagen, Denmark)

ERRATA

CRA 3(6):#1484, 1965. Change author to Koldovský, P.

CRA 2(1):#11, 1964. Last sentence: change (7):#1212 to (7):#1222.

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AUTHOR INDEX

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ABBREVIATIONS USED IN ABSTRACTS

admin.	administered, administration	max.	maximum, maximal
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
C	curie(s)	ml	milliliter(s)
mC, μ C	milli-, microcurie(s)	mm	millimeter(s)
cm	centimeter(s)	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
CPE	cytopathic effect	NCI	National Cancer Institute
cpm	counts per minute	NIH	National Institutes of Health
DNA	deoxyribonucleic	p.o.	orally
DNase	deoxyribonuclease	PFU	plaque forming unit(s)
e.g.	for example	ppm	parts per million
FFU	focus forming unit(s)	pt(s).	patient(s)
g	gram(s)	RBC	red blood cells (erythrocytes)
μ g	microgram(s)	RES	reticuloendothelial system
g.i.	gastrointestinal	resp.	respectively
hr.	hour(s)	RNA	ribonucleic acid
ID ₅₀	median infectious dose	RNase	ribonuclease
i.m.	intramuscular	s.c.	subcutaneous
incub.	incubate(d), incubation	soln.	solution(s)
inj.	injected, injection(s)	TCID	tissue culture infectious dose
inoc.	inoculated, inoculation(s)	x	times (e.g. x 3/wk.)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	VA	Veterans Administration
kg	kilogram(s)	vol.	volume
LD ₅₀	median lethal dose(s)	WBC	white blood cells (leukocytes) or count
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mM, μ M	milli-, micromolar	yr.	year(s)

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	E.	English	Hun.	Hungarian	Lith.	Lithuanian	Ser.	Serbo-Croatian
Ar.	Arabic	Eston.	Estonian	Ic.	Icelandic	Maced.	Macedonian	Sl.	Slovene
Bul.	Bulgarian	Fin.	Finnish	Ind.	Indonesian	Nor.	Norwegian	Sp.	Spanish
Ch.	Chinese	Fr.	French	It.	Italian	Pol.	Polish	Sw.	Swedish
Cz.	Czech	Ger.	German	Jap.	Japanese	Por.	Portuguese	Th.	Thai
Dan.	Danish	Gr.	Greek	Kor.	Korean	Rum.	Rumanian	Uk.	Ukrainian
Dut.	Dutch	Heb.	Hebrew	Latv.	Latvian	Rus.	Russian	Viet.	Vietnamese

REVIEW

2094 CANCER AND METABOLISM. (Ger.)
Holzer, H. (Inst. Biochem., U.
Münster, Germany). Med. Klin. 59(46):1809-1813,
1964.

Review is presented of various aspects of
metabolism in relation to the treatment of
cancer. (16 references)

2095 SOCIAL IMPORTANCE OF SOME ENVIRON-
MENTAL FACTORS IN THE ETIOLOGY OF
CANCER IN MAN. (It.) Orofino, G. (Inst. Gen.
Path., U. Rome). Polislinico (Med.) 71(6):
411-414, 1964.

General survey emphasizing the dangers to man
connected with the use of plastic resins, deter-
gents, food additives, dyes, radiant energy and
chemicals which cause occupational neoplasms.
(10 references)

2096 SOME ASPECTS OF TUMOR ETIOLOGY AND
PATHOGENESIS. (It.) Michelazzi, L.
(Inst. Gen. Path., U. Genoa, Italy). Rass.
oncolog. 40(2):49-52, 1964.

Review and general discussion emphasizing
common aspects of viral and genetic theories of
carcinogenesis. (No references)

2097 EPIDEMIOLOGY AND PREVENTION OF CANCER.
(Sp.) Zuckermann, C. (Nat. Cancer
Inst., Mexico City, Mexico). Rev. Sanid. Milit.
18(4):157-162, 1964.

A very general discussion the author attempts
to summarize current knowledge on cancer frequency
in various countries, predominant types, pre-
disposing factors and preventive measures.
(10 references)

2098 PROGRESS IN CYTOGENETICS. METHODS OF
INVESTIGATION OF HUMAN MITOTIC
CHROMOSOMES, THE MECHANISM OF DEVELOPMENT OF
CHROMOSOMAL ABERRATIONS, TYPES AND FREQUENCY OF
OCCURRENCE OF ABNORMAL KARYOTYPES. (Pol.)
Kozłowski, J. (Inst. Gen. Exp. Path., Acad. Med.,
Warsaw, Poland). Postepy Hig. Med. Dosw. 18(2):
1-192, 1964.

General review which includes a brief discus-
sion of the cytogenetic aspects of carcinogenesis
and the damage to chromosomes due to irradiation.
(50 references)

2099 CYCLIC CHANGES OF THE HAIR FOLLICLES
OF THE SKIN AND THEIR ROLE IN EXPERI-
MENTAL CARCINOGENESIS. (Rus.) Turusov, V. S.
(Inst. Exp. Clin. Oncol., Acad. Med. Sci. USSR).
Zh. Pat. 25(1):3-13, 1963.

In a review of the hair cycle in rodents, it is
pointed out that more tumors result when carcino-
genic agents are applied during the resting phase
(probably due to longer contact) than during the
growth phase of the hair follicles. Ionizing
radiations had more effect on the hair follicles
during the growth phase. (See also CRA 3(8):#2110,
1965.) (72 references)

65-2100 RELATION BETWEEN TUBERCULOUS LUNG
CHANGES AND PRIMARY LUNG TUMORS. (Ger.)
Schwartz, P. (Warren State Hosp., Pa.). Prax.
Pneumol. 19(2):80-93, 1965.

See CRA 2(4):#625, 1964. (See also CRA 3(8):#2265,
1965.) (43 references)

65-2101 SOME FACTS AND FANCIES ABOUT CANCER.
(E.) Horsfall, F. L., Jr. (Sloan-
Kettering Inst. Cancer Res., New York, N. Y.).
Percept. Biol. Med. 8(2):167-179, 1965.

See CRA 3(4):#675, 1965. (25 references)

65-2102 THE IMPLICATIONS OF RECENT FINDINGS IN
ANIMAL TUMOR VIRUSES FOR THE POSSIBLE
VIRUS ETIOLOGY OF HUMAN CANCER. (E.) Habel, K.
(NIH, Bethesda). Industr. Med. Surg. 34(2):
171-179, 1965.

In a review and discussion of viral tumorigenesis
in animals and in vitro, it is concluded that at
least some human tumors must have a viral etiology.
(36 references)

65-2103 CELL-REGULATING MECHANISMS AND CANCER.
(Dut.) Emmelot, P. (Dept. Biochem.,
Antoni van Leeuwenhoek Hosp., Amsterdam, The
Netherlands). Nederl. T. Geneesk. 107:1604-1613,
1963.

A pre-conference review of current theories con-
cerning the role of cell-regulatory mechanisms
in carcinogenesis is supplemented by summaries of
papers to be given at the International Conference
on Cellular Control Mechanisms and Cancer (see
CRA 2(8):#1437, 1964). These include discussions
of the roles of "messenger" and "transfer" RNA in
protein synthesis (F. Gros); the role of enzyme-
regulatory mechanisms (H. E. Umbarger; F. Jacob);
other mechanisms affecting cell-differentiation
(G. H. Beale, M. Fischberg, H. G. Williams-Ashman,
W. S. Bullough); those involved in embryonic-cell
"somatic mutation" and irreversible cell-dedif-
ferentiation (S. Barski, M. Feldman); and those
involved in interactions between specific cell
constituents and carcinogenic agents: chemical
carcinogens (P. N. Magee), irradiation (R. Latar-
jet), oncogenic viruses (A. F. Howatson; W. R.
Bryan), and hormones (L. Foulds). The relation-
ship between hormonal status and susceptibility

to chemical carcinogens was discussed by H. Shay and E. Boyland. I. Berenblum reported the ability of urethan to "transform" a virus-precursor in mice (induced or uncoupled by X-irradiation) into an active oncogenic virus. Chromosomal changes in cancer cells were discussed by P. C. Koller; the metabolic and structural characteristics of minimal-deviation hepatoma, by V. R. Potter and K. R. Porter. G. Klein detailed some of the problems raised by the immunologic theory of carcinogenesis. A summation of the conference proceedings was presented by H. S. Kaplan. (No references)

- 65-2104 ESTIMATION OF CAUSAL RELATIONSHIP BETWEEN BRONCHIAL CANCER AND SILICOSIS. (Ger.) Schwaderer, A. (7 Baumbach St., Hannover, Germany). Med. Sachverstaend. 60(6):128-137, 1964.

A review and discussion is presented of the probability that silicosis is causally related to bronchial cancer. In general, this concept is denied except when the cancer has its origin in silicotic areas or in lungs where chronic bronchitis has existed as a sequela of silicosis. (35 references)

- 65-2105 VIRAL ETIOLOGY OF LEUKEMIA. COMBINED CLINICAL STAFF CONFERENCE AT THE NATIONAL INSTITUTES OF HEALTH. (E.) Bryan, W. R. (NCI, Bethesda), J. B. Moloney, T. E. O'Connor, M. A. Fink and A. J. Dalton. Ann. Intern. Med. 62(2):376-399, 1965.

A discussion and review are presented on the animal leukemias, virus ultrastructure and sites of virus multiplication, transmission of the leukemia agent, tumor producing activity of the viral nucleic acid, the biophysical studies on animal leukemia viruses, immunological studies on leukemia viruses and the application of the present virological technics and concepts to the human problem. (52 references)

- 65-2106 THE IMMUNOCHEMISTRY OF CANCER. (E.) D. E. D. Charles C. Thomas (Publ.), Springfield, Ill., 1965, 170 pp., \$6.75.

A review of the discovery of the distinctive antigens of cancer from the initial work of Witebsky and of Hirszfeld, Halber and Laskowski in 1929 and other workers to the isolation and characterization of some cancer-distinctive lipids, proteins, and antigens, followed by review of antigenic transformations (deletions) as expressions of malignancy and the use of immunochemistry in the design of therapeutic and diagnostic anticancer agents. (136 references)

- 65-2107 REFLECTIONS ON THE UNIVERSALITY OF CANCER IN THE ANIMAL WORLD. (Fr.) Lombard. Rev. Path. Comp. 64(8):397, 1964.

See CRA 3(5):#995, 1965. (No references)

- 65-2108 PRENATAL X-RAY AND CHILDHOOD CANCER: A REVIEW. (E.) MacMahon, B. (Dept. Epidemiol., Harvard U. Sch. Public Health, Boston, Mass.) and G. B. Hutchison. Acta Un. Int. Cancr. 20(4-5):1172-1174, 1964.

See CRA 1(1):#40, 1963. (11 references)

- 65-2109 CURRENT KNOWLEDGE ON THE ETIOPATHOGENESIS OF TUMORS. (It.) Bianchi, C. M. (1st Dept. Surg., Inst. Hosp., Cremona, Italy). Boll. Soc. Medicochir. Cremona 18(4):321-324, 1964.

In a brief review the author questions the hypothesis of "heterotopic tumors", inasmuch as various tissues in the normal as well as neoplastic state are known to elaborate hormones other than those characteristic of the tissue. One example is the ability of normal testicular tissue and testicular tumors to secrete corticosteroids. (No references)

See also abstract no.: 2177

PHYSICAL CARCINOGENESIS

65-2110 SKIN TUMORS INDUCED IN THE RATS BY RADIOACTIVE CERIUM BETA IRRADIATION. (U.S.) Turusov, V. S. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow). Vestn. Akad. Nauk SSSR 19(12):87-92, 1964.

During the local irradiation of the skin of random-bred rats with β -rays of radioactive cerium a significant increase in the carcinogenic effect was noted with increase in the dose; i.e., a single dose of 0.25, 0.5 or 1 million r/cm² induced 4, 6 or 14 tumors (of which 7 were sarcomas and 2 were precancerous sarcomas), respectively, in 4/44, 4/51 or 13/39 rats, resp. Latent period varied from 12-25 mo. When the dose was fractionated (20 weekly or 5 monthly doses) fewer tumors were induced. After the irradiation of the skin during the resting period of the hair growth cycle 10 tumors (of which 2 were malignant) developed in 6/14 rats, while during the period of hair growth only 2 tumors developed in 1/12 rats. Controls (25) did not develop spontaneous tumors.

65-2111 MALIGNANT LYMPHOMA IN SURVIVORS OF THE ATOMIC BOMB EXPLOSION IN HIROSHIMA. (U.S. & Jap., Abstract) Anderson, R. E. (Atom. Bomb Casual. Comm., Hiroshima, Japan), K. Ishida, Y. Yamamoto and D. W. Will. Nippon Byori Gakkai Shishi (Trans. Soc. Path. Jap.) 53:178-179, 1964.

An analysis of 91 cases of unequivocal malignant lymphoma diagnosed by lymph node biopsy and/or autopsy at the Atomic Bomb Casualty Commission, Hiroshima, during 1949-62, an increased prevalence of Hodgkin's disease, lymphosarcoma and multiple myeloma was found among those proximally exposed to the atomic bomb explosion (within 1,400 m of the hypocenter). The incidence of reticulum cell sarcoma was decreased.

65-2112 ASBESTOSIS AND CANCERS. (Fr.) Noeninckx, F. (Stuivenberg Sanitor., Antwerp, Belgium). Acta Tuberc. Belg. 55(2):12-109, 1964.

Three cases of pulmonary cancer were observed among 10 pts. with asbestosis; all were asbestotic workers in a small factory. The pts. affected by cancer were all men; their ages were 51-55 yr. at the time of cancer diagnosis. One of these pts. had, in addition, a malignant peritoneal tumor similar to that described in recent literature as being caused by asbestos fibers.

65-2113 A SARCOMA OBSERVED IN THE IRRADIATED MONKEY. (E.) Gowgiel, J. M. (Loyola Sch. Dent., Chicago, Ill.). Radiat. Res. 33(3):446-451, 1965.

14 young 20-37-month-old Macaca rhesus

monkeys treated with 50 doses (200 r; total 7500) of X-irradiation to the maxilla and mandible, only 1 developed a fibrosarcoma in the left mandible 2 yr. and 1 mo. after completion of radiation treatment. The tumor was suspected to have arisen at the junction of irradiated and nonirradiated tissue.

65-2114 MECHANISMS OF RADIATION CARCINOGENESIS AT THE CLINICAL LEVEL. (E.)

Fabrikant, J. I. (Dept. Radiol. Sci., Johns Hopkins U., Baltimore, Md.), R. J. Dickson and B. F. Fetter. Brit. J. Cancer 18(3):459-477, 1964.

Six case histories are reported of pts. in whom cancer was induced as a consequence of radiation exposure made to treat a benign or malignant neoplasm or to establish a radiological diagnosis following internal admin. of a radioactive contrast material (Thorotrast). The latent interval between exposure and development of cancer varied between 4 and 35 yr.

65-2115 A SARCOMA WHICH DEVELOPED AT THE SITE OF AN EXTRAVASCULAR INJECTION OF THOROTRAST. (Ger.) Kemnitz, P. (Inst. Path., Magdeburg Acad. Med., Germany) and H. Vinz. Zbl. Allg. Path. 106(4-5):502-511, 1964.

A case report. (See also CRA 2(3):#447, 1964.)

65-2116 THE IMPORTANCE OF THE SPLEEN IN THE FORMATION OF TUMORS AFTER IRRADIATION.

(Fr.) Gross, K. (Inst. Oncol., Prague, Czech.) and B. Schober. Acta Un. Int. Cancr. 20(6-7):1564-1567, 1964.

Preliminary results of 2 experiments conducted in female Wistar rats indicate that the incidence of tumors (mostly mammary) produced by irradiation might be lower in splenectomized than in intact animals. The number of rats used was too small and the data were not always statistically significant. No tumors were seen in irradiated splenectomized and intact male rats.

65-2117 INFLUENCES OF IRRADIATIONS ON TUMOR DEVELOPMENT AND PATHOLOGIC PROLIFERATIVE PROCESSES IN MONKEYS. (E.) Yakovleva, L. A. (Inst. Exp. Path., Acad. Med. Sci., Sukhumi, USSR). Acta Un. Int. Cancr. 20(4-5):1187-1189, 1964.

A single whole-body irradiation with X-ray and gamma rays was admin. to 4 male and 14 female monkeys (4-17 yr.). No tumors developed in monkeys irradiated with doses smaller than 450 r nor in those given 500-750 r and which died within 11 mo. Among the 12 monkeys that died later than 11 mo. after exposure (480-700 r), there developed 1 myeloid leukemia and 1 malignant neoplasm of the

epiglottis. There also developed 2 adenomas (1 thyroid, 1 liver), 3 showed endometriosis and 4 polyps of the uterine cervix (1 with kidney adenoma). The latent periods ranged from 11.5 mo. to 6.6 yr.

65-2118 PROTEIN METABOLISM IN BONES DURING THE DEVELOPMENT OF THE OSTEOGENIC SARCOMAS INDUCED BY Sr^{90} . (E.) Petrova, N. D. (Zivopisnaia, Ul D. 28/191, Kv. 53, Moscow D 182) and L. T. Tootochkina. Acta Un. Int. Cancr. 20(4-5):1155-1156, 1964.

Albino rats (wt. 140-180 g) received a single inj. of Sr^{90} (0.4-0.5 $\mu\text{C/g}$ i.p.). A general disease resulted which led to development of bone tumors after 6-12 mo. An increased level of low molecular wt. acid serum mucoids (SM) preceded the development of tumors. It was suggested that the tumor is a direct source of some components of the SM fraction.

65-2119 SOME RESULTS OF STUDYING THE BLASTOM- GENIC EFFECT OF RADIOACTIVE ISOTOPES.

(E.) Kraevsky, N. A. (USSR Acad. Med. Sci., Moscow), V. N. Streltsova and Y. I. Moskaiev. Acta Un. Int. Cancr. 20(4-5):1151-1154, 1964.

When radioactive fission products of uranium (Sr^{89} , Sr^{90} , Y^{90} , Y^{91} , Ba^{140} , Pu^{239} , unseparated nuclide soln., Ce^{144} , Pm^{147} , La^{140} , Cs^{137} , Nb^{95} and Ru^{106}) were admin. to 2067 rats, there developed 773 tumors, 314 osteosarcomas, 459 tumors of the soft tissues and 96 leukoses. As to site, 79 were in the hypophysis, 44 in other glands of internal secretion, 30 in the liver, 3 stomach, 28 intestine, 106 mammary gland. The tumors induced by the deposited radioisotopes varied according to the laws of distribution of these elements. When radioactive compounds with no or little resorption capacity were incorporated in the organism, their carcinogenic effect was determined by the site of deposition and the resorption capacity of the element. (See also CRA 1(2):#168; and ibid., (5):#812, 1963.)

See also abstracts nos.: 2095, 2098, 2101, 2108, 2150, 2185, 2206, 2214

CHEMICAL CARCINOGENESIS

65-2120 INHIBITION OF SKIN TUMORIGENESIS IN STRAIN B6AF₁/J FEMALE MICE WITH MALEIC ANHYDRIDE. (E.) Klein, M. (Dept. Anat., U. Tennessee Med. Units, Memphis). J. Nat. Cancer Inst. 34(2):175-183, 1965.

Following abstract is substituted for titular citation 3(6):#1435, 1965. Induction of skin tumors with 7,12-dimethylbenz(a)anthracene (DMBA) alone, or DMBA and croton oil, in strain B6AF₁/J hybrid mice was inhibited when maleic anhydride (MA) was applied repeatedly to an area of skin exposed to carcinogen. Inhibition was noted when MA was admin. prior to, but not after, treatment with DMBA, as reflected in a prolonged latent period and a decreased tumor yield. Similar results were obtained whether or not the mice were treated with croton oil in addition to DMBA. No inhibition occurred when treatments with MA and croton oil were alternated. Inhibition appeared to be directed against the "initiating" rather than the "promoting" stage of skin tumorigenesis.

65-2121 CARCINOGENIC SUBSTANCES IN WATER AND SOIL. XVI. DETECTION OF POLYCYCLIC AROMATIC COMPOUNDS IN WATER SAMPLES BY DIRECT EXTRACTION. (Ger.) Borneff, J. (Inst. Hygiene, Mainz, Germany) and H. Kunte. Arch. Hyg. Bakt. 8(8):585-597, 1964.

The content in various waters (W; in µg/m³) of total polycyclic aromatic hydrocarbons, and, in parentheses, carcinogen content (µg/m³ of W) was: underground W 34-513 (1-81); in refined Lake W 25-234 (7-54); in untreated Lake W 65 (30); in mixed W (underground W + lakeshore W) 138 (9); sand pit W 244 (25); Sprengz W 121-155 (38-55); Rhine W 108-1494 (9-728); Danube W 202-277 (55-78); Main River W 2-623 (155-189). The increase in the content of carcinogens (such as 3,4-benzpyrene, 1,2-benzanthracene, etc.) in W is closely related to the source of the W. Therefore, the content of carcinogens (in µg/m³) for ground W was 1-10, for refined river or lake W 10-25, for surface W 10-100, and for heavily contaminated surface W >100. It was found that the content of carcinogens in river W increases with an increase in the amount of waste in the W. (See also CRA 2(3):183, 1964.)

65-2122 CARCINOGENESIS OF 7-KETOCHOLESTEROL. (Ger.) Zschiesche, W. (Inst. Microbiol., German Acad. Sci. Berlin, Jena) and H. Bruns. Oncologia (Basel) 18(4):289-299, 1964.

The carcinogenic effect could be demonstrated with 7-ketocholesterol (Δ^5 -cholestene-3 β -ol-7-one; total 20 mg, in sesame oil, admin. as 3 s.c. inj. at 14-day intervals) in AB/Jena and C57BL mice (2-4 mo. old males and females, wt. 20 g). Administration of cortisone acetate (total 0.54 mg/min. as 18 i.m. inj. within 6 wk.) did not

increase the expected tumor rate. The use of sesame oil, as the solvent for cholesterol derivatives, is definitely disadvantageous. Sesame oil possesses a still unexplained cocarcinogenic effect and an amyloidogenic effect in AB/Jena mice. All these factors make an exact statistical evaluation difficult. In both treated and control animals, tumors such as mammary carcinoma, retothelial sarcoma, and fibrosarcoma were found. Some treated mice showed myeloid or lymphatic leukemia. (See also CRA 2(2):#224, 1964.)

65-2123 EXPERIMENTAL STUDIES OF PROSTATIC TUMORS. I. PRODUCTION OF THE PROSTATIC TUMOR OF RAT WITH 20-METHYLCHOLANTHRENE. (Jap.) Takenaka, I. (Dept. Urol., Hiroshima Sch. Med., Japan). Hinyokika Kiyo (Acta Urol. Jap.) 10(11):745-758, 1964.

In 3 groups of Wistar hybrid male rats (approx. 70 g), transabdominal inj. into the anterior lobe of the prostate of 20-methylcholanthrene (3% in Tween 80), 0.1 ml, resulted in tumor formation in 14/26 by the end of the observation period (181 days). In one group 25% showed tumors by day 100, in the second group 3/5 had tumors by day 180 and 58.9% of a third group showed tumors by day 181. The earliest tumor formation occurred at 88 days. Histologically, 10/14 were squamous cell carcinoma, 2/14 papilloma, 1/14 sarcoma, and 1/14 adenoma. The development of squamous metaplasia of the glandular epithelium was considered to be a continuous and transitional phase to the subsequent irreversible change to squamous cell carcinoma.

65-2124 EXPERIMENTAL SARCOMA IN GERBILS. (Rus.) Papoian, S. A. and V. N. Zil'fian. Zhur. Eksp. Klin. Med. (Erevan, Arm. SSR) 4(3):25-31, 1964.

Meriones tristami Thom. (MT; Asia Minor gerbil; jird) and Meriones vinogradovi Hept. (MV; Vinogradov's gerbil; jird) were sensitive toward the carcinogenic action of 9,10-dimethyl-1,2-benzanthracene (DMBA) and relatively resistant toward its toxic action. Of 20 animals (wt. 100 g) treated with DMBA (2 mg in peach oil once, s.c. on the animal's side), 15 survived until the appearance of the first tumors. The tumors which developed in 9/15 by day 78-135 following treatment were polymorphocellular or spindle cell sarcomas. Tumor necrosis was seen in 3 by day 120-150. Sex was not a factor in induction of tumors. Homo- and heterotransplantations of the induced tumors from MT to MV were successful, even without any conditioning.

65-2125 CONSIDERATIONS ON SOME CASES OF BENZENE INDUCED LEUKOSES AMONG WORKERS IN THE

SHOE INDUSTRY. (It.) Mazzella Di Bosco, M. (Occupat. Clin., Florence, Italy). Lavoro Um. 16:105-121, 1964.

In 1961-63 among over 8,000 workers in the shoe industry of the province of Florence (Italy), 3 died from acute or subacute hemoblastosis: a 52-year-old woman with subacute histioleukemic blastomatosis, a 46-year-old man with acute erythro- and granuloblastic leukemia with RES involvement, and a 39-year-old man with hemocytoblastic leukemia. The diseases were ascribed to benzene intoxication, the exposure having lasted 20, 27 and 13 yr., resp. A review of the literature is included (78 references).

65-2126 NASAL CAVITY TUMORS IN MICE AFTER PERCUTANEOUS DIETHYLNITROSAMINE APPLICATION. (Ger.) Hoffmann, F. (Inst. Med., German Acad. Sci. Berlin, Berlin-Buch) and A. Graffi. Arch. Geschwulstforsch. 23(4): 274-288, 1964.

Strain A, XVII, CBA, and AB mice (both sexes; 3-4 mo. old) received a single or daily applications of 2-3 drops of undiluted or a 0.2-20% acetone soln. of diethylnitrosamine (DENA) with or without croton oil, dropwise to the shorn back. No skin tumors developed, even after treatment lasting 10 mo. However, precancerous hepatic changes occurred within several wk. After 7 mo. of treatment (total DENA, 1350 mg/kg of body wt.), a hepatic reticulum cell sarcoma and a pulmonary adenoma developed. After a total of 7.5 mg, one AB mouse showed a large carcinoma of the nasal cavity; 4 wk. later, 7 other mice manifested similar findings. Among 31 mice still alive in this group, 19 were found histologically to have similar nasal cavity tumors (87% of the animals; 17/27 treated with DENA only and 10/27 with DENA plus croton oil). Groups of 14 CBA mice then received 1-2 drops of a 0.5% acetone soln. of DENA into the nostrils and were sacrificed 8-48 hr. or 4-14 days later. Serial histological sections of the nasal tissues showed the stages in the development of the keratotic and non-keratotic squamous cell carcinomas. Carcinogenic action of various nitrosamines and related substances is tabulated. (See also CRA 2(7):#1282, 1964.)

65-2127 INVESTIGATIONS DURING THE CANCERIZATION PHASE DUE TO DIETHYLNITROSAMINE. (Ger.) Hauss, W. H. (Clin. Med., U. Munster/Westf., Germany), H. J. Albrecht, U. Gerlach, G. Junge-Hülsing, J. C. Kingreen, S. Ritter, H. Themann and G. Wüst. Mitt. Ges. Bekampf. Krebs. (Nordrhein-Westf.) 3(3):323-340, 1964.

Diethylnitrosamine (D), 1.2 mg/kg/day, was admin. p.o. (in drinking water) to 135 male Wistar rats (wt. 100-140 g) which were then sacrificed on day 20-278. Detailed electron microscope studies showed reactive changes in the hepatic parenchymal

cells, particularly in the endoplasmic reticulum within 20 days of D admin. Liver tumors became macroscopically evident on day 189. Deaths due to carcinoma started on day 200. Lymph node and pulmonary metastases appeared after 206 days. Esophageal papillomas were found in 26 animals. A slight decrease in the incorporation of radioactive sulfate into the chondroitinsulfate of liver and skin was noted. Various enzyme activities in liver were not disturbed (LDH, GOT, SDH). An increased enzyme activity in the serum of experimental rats was first noted in late stages of tumor development.

65-2128 MORPHOLOGICAL CHANGES OF SALIVARY GLANDS OF RATS IN THE PROCESS OF EXPERIMENTAL CARCINOGENESIS. (Rus.) Iosava, V. (Inst. Oncol., Tbilisi, Georgian SSR). Soobshch. Akad. Nauk Gruz. SSR (Tbilisi) 36(1):209-216, 1964.

Random-bred albino rats which received a single s.c. inj. of 9,10-dimethyl-1,2-benzanthracene into the parotid or submaxillary glands showed tumor-like proliferations of the salivary gland epithelium after 2 mo. Cancer of the glandular region of the epithelium developed from acinar sections, salivary tubes and small excretory ducts of the gland. Squamous epithelial cancer also originated from cells of the excretory ducts of the gland as well as from foci of squamous cell metaplasia at the edges of necrotic foci. The source of lymphangiomas, lymphomas and sarcomas of the salivary glands was the connective tissue layers which separated the lobules of the gland. Morphologic changes are discussed in detail.

65-2129 EXPERIMENTAL STUDIES ON 8-HYDROXYQUINOLINE IN RATS AND MICE. (E.) Hueper, W. C. (9307 Rockville Pk., Bethesda, Md.). Arch. Path. (Chicago) 79(3):245-250, 1965.

A 20% suspension of 8-hydroxyquinoline (H) was instilled (0.2 ml, 2x/wk.) intravaginally in 30 rats (Bethesda black; 3 mo. old) and in 80 mice (C57 black; 2 mo. old) or intrarectally in 20 male and 15 female rats; also, 60 male and 60 female mice received 0.05 ml intrarectally. A marked glandular, and sometimes papillary, hyperplasia of the endometrium occurred in 7 rats treated intravaginally, and uterine adenocarcinomas and squamous cell carcinomas were found in a few. Only 1/30 controls (instilled with 20% gelatin) had a uterine carcinoma. With intrarectal admin., 2 experimental and 1 control rat had uterine carcinomas; a glandular endometrial hyperplasia was noted in only 1 experimental rat. No abnormalities of rectal mucosa were found. Other tumors were tabulated, but were considered as unrelated to the admin. of H. No specific neoplastic effect of H was demonstrated in mice. The results were considered to support the thesis that H is a carcinogen. The numerous industrial, medicinal, sanitary, cosmetic, and food-additive uses of H are tabulated.

5-2130 THE POSSIBLE ROLE OF RIBOFLAVIN DEFICIENCY IN EPITHELIAL NEOPLASIA. I. EPITHELIAL CHANGES OF MICE IN SIMPLE DEFICIENCY. (E.) Wynder, E. L. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.) and U. E. Klein. Cancer 18(2):167-180, 1965.

When female 3-week-old Swiss ICR mice were fed a riboflavin-deficient diet (diet A with 5% fat and diet B with 10% fat) for 5 and 8 wk., the following changes were seen: marked retardation of growth; eye changes; seborrheic eczema and hair loss of the skin; simple atrophy in the epithelial surfaces of the tongue, buccal mucosa, bronchial mucosa, renal pelvis, ureter and bladder; marked atrophy and hyperkeratosis of the skin, esophagus and fore-stomach epithelium as well as hyperplasia of the skin epithelium. These changes were produced more quickly with diet B. Simple starvation of the mice led to atrophy and hyperkeratosis of the skin epithelium as well as to atrophy of other epithelial surfaces. Theoretical considerations of the possible role of riboflavin deficiency to damaged cellular respiration and Plummer-Vinson disease, and of the relationship of alcoholism to neoplasia, are presented.

5-2131 THE CARCINOGENIC POTENCY OF CERTAIN OILS. (E.) Bingham, E. (Dept. Prev. Med., U. Cincinnati Coll. Med., Ohio), A. W.orton and R. Tye. Arch. Environ. Health (Chicago) 10(3):449-451, 1965.

The carcinogenic potency of 15 oils (petroleum distillates) was tested by repeated applications with a dropper, approx. 50 mg of undiluted oil 2x/wk. until appearance of papilloma, death of animal, or termination of experiment at 80 wk. to the skin of the interscapular region of male 3H/HeJ mice. Seven oils were carcinogenic and produced malignant tumors; another produced only benign tumors (2). None of 8 oils processed by solvent refining produced malignant tumors; hence this process appeared to remove carcinogens. Extraction by solvents such as phenol, cresol, or xurfural appeared to be more effective in removing carcinogenic compounds from the oils than the conventional refining procedure. Sulfurization of 2 of the oils led to tumors after only 13 and 13 wk., indicating increased tumorigenic potency. The oils were analyzed for their content of 4- and 5-ring aromatic hydrocarbons but a definite correlation to carcinogenicity was not established with certainty.

5-2132 CARCINOGENIC ACTION OF MOTOR ENGINE OIL ADDITIVES. (E.) Baldwin, R. W. (Cancer Res. Lab., U. Nottingham, England), G. J. unningham and D. Pratt. Brit. J. Cancer 18(3):503-507, 1964.

Young adult male Schofield mice were skin painted or 2x/wk. for up to 12 mo. with a proprietary

engine oil additive (Additive I; 32 ml total), a proprietary upper cylinder lubricant (Additive II; 33 ml total), or the component parts of Additive I which were base oil (B0; 21 ml total), additive concentrate (AC; as a 20% v/v soln. in double distilled AR benzene, 6 ml total) and lead naphthenate (LN; as a 20% v/v soln. in benzene, 6 ml total). B0 was highly toxic with only 40% survival for the mice. The time the first tumor appeared, the percentage of total tumors and percentage of skin carcinomas for the various groups were as follows: Additive I, 135 days, 69% and 51%; Additive II, 172 days, 46% and 19%; B0, 68 days, 66% and 17%; AC, 245 days, 3% and --; LN, 193 days, 4% and --, resp. B0 produced mainly benign papillomas; only 17% showed skin carcinomas which was in contrast to the 51% skin carcinoma incidence with Additive I. LN induced marked kidney damage and tubular adenomas with 1 renal carcinoma. The tumors produced by Additive II were mainly benign papillomas. The manufacturers indicate that the B0 is a spindle oil. The authors note that a larger series of oil additives and their components require evaluation in order to assess the possible potential health hazard of these substances.

65-2133 ULTRASTRUCTURAL HEPATIC ALTERATIONS FOLLOWING TANNIC ACID ADMINISTRATION TO RABBITS. (E.) Arhelger, R. B. (Dept. Path., U. Mississippi Sch. Med., Jackson), J. S. Broom and R. K. Boler. Am. J. Path. 46(3):409-434, 1965.

Hybrid 4-week-old male and female rabbits were given a single s.c. inj. of tannic acid (1 ml; 40% acid) and the liver was examined by light and electron microscopy 1-168 hr. later. Within 1 hr. there was a decrease in the glycogen content and disorganization and dilatation of the hepatic parenchymal granular endoplasmic reticulum, while at 4 and 12 hr., fatty metamorphosis and an increase in agranular reticulum were seen; at 48 hr., extensive centrilobular necrosis was observed. Macrophages and Kupffer cells filled with phagosomes were abundant at 72 and 96 hr. The kidneys also showed abnormalities.

65-2134 EXPERIMENTAL STUDIES ON THE BIOLOGICAL POTENTIAL OF BLADDER TUMORS. (E.) Veenema, R. J. (Dept. Urol., Columbia U., New York, N. Y.), B. Fingerhut and J. K. Lattimer. J. Urol. 93(2):202-211, 1965.

DNA and RNA synthesis within bladder tumor specimens from 50 pts. and in 2N acetylaminofluorene (2-FAA; in a vitamin B₆-deficient diet)-induced bladder neoplasms in Fisher Furth rat was studied radioautographically. There was a good correlation between the degree of DNA synthesis in the induced tumor in the rat and spontaneously occurring human tumor. In the 2-FAA-induced tumor (see CRA 2(2):#255, 1964), DNA synthesis could be seen to go from low to higher and higher values as the tumor matures, while RNA synthesis was

moderate to high throughout the period of tumor development. Human tissue with high DNA synthesis appeared to be more active and more malignant.

65-2135 BRONCHOGENIC CARCINOMA PRODUCED EXPERIMENTALLY IN THE NORMAL DOG. (E.)

Staub, E. W. (Dept. Surg., Presbyt.-St. Luke's Hosp., Chicago, Ill.), R. Eisenstein, G. Hass and E. J. Beattie, Jr. J. Thorac. Cardio. Surg. 49(3):364-372, 1965.

Of 14 adult normal dogs (both sexes) admin. a 1% gelatin suspension of 9,10-dimethyl-1,2-benzanthracene (DMBA; 2 mg in 0.5 ml for 63 wk. or until death) weekly in the right main-stem bronchus, 10 died with pulmonary infection. Invasive carcinoma was found in 3/10 dogs who had been treated for periods of 11 mo. or more; metastases were seen in 2 dogs. These tumors did not regress following cessation of treatment. Four other dogs had non-invasive tracheobronchial carcinomas (carcinoma *in situ*). Ulceration of the tracheobronchial mucosa as well as squamous metaplasia and dysplasia were common. These results are comparable to those obtained in dogs with a reversed segment of the cervical trachea. (See also CRA 1(8):#1622, 1963.)

65-2136 THE EFFECTS OF HORMONAL ENVIRONMENT OF MAMMARY CARCINOGENESIS IN C3Hb MICE BY 1,2,5,6-DIBENZANTHRACENE. (E.) Jull, J. W. (Cancer Res. Ctr., U. British Columbia, Vancouver, Canada). Brit. J. Cancer 18(3):508-512, 1964.

C3Hb Leeds 3-5-month-old mice skin painted for 8 wk. with 16 drops (about 2 mg) of a 0.25% soln. of 1,2,5,6-dibenzanthracene (DBA) were maintained as follows: (1) as normal virgins; (2) received estrone (E; 1 mg/l in drinking water); (3) were kept in the presence of vasectomized males and were pseudopregnant; (4) had normal breeding; (5) were force bred. There was greater incidence of breast tumors in mice subjected to pseudo-pregnancy (86%), normal breeding (59%), E admin. (45%) or forced breeding (30%) than there was in normal virgins (25%). These changes also reduced the latent period of tumor induction. Structurally all the breast tumors were adenocarcinomas similar to those induced by the milk agent.

65-2137 HEPATOMA IN INTACT C3Hf MALE AND VIRGIN FEMALE MICE AND AFTER GONADECTOMY ALONE OR SUBSEQUENT TREATMENT WITH OESTROGEN. (E.) Pullinger, B. D. (Dept. Cancer Res., Roy. Beatson Mem. Hosp., Glasgow, Scotland) and M. A. Head. Brit. J. Cancer 18(3):521-527, 1964.

C3Hf mice were admin. various hormonal treatments; all estrogens were admin. topically 1x/wk. for 60 wk. The hormonal treatments and incidences of hepatoma at 16 mo. of age or more were as follows: 103 breeding females, 6.8%; 110 virgin females, 24.5%; 71 breeding males 28.2%; 32

ovarectomized (ovx.; at 56-111 days of age) females, 25%; 25 castrated males, 32%; ovx. + 5 or 10 µg estrone, 15.1% and 5.2%, resp.; 41 ovx. + mixture of 10 µg estrone, estradiol-17β, and estriol, 12.2%; 34 ovx. + estriol (10 µg) only, 29.4%; 16 ovx. + 200 µg estriol, 6.2%; 31 castrated males + estrone (5 µg), 12.5%; 28 normal males + estrone (5 µg), 25%. Mammary carcinomas were more frequent in mice receiving the larger doses of estrogen; 33.3% of those treated with 200 µg of estriol developed mammary tumors. While the larger doses of estrogens significantly reduced the incidence of hepatoma, they also affected survival and weight.

65-2138 FURTHER EXPERIMENTS ON IMPLANTATION OF MATERIALS INTO THE URINARY BLADDER OF MICE. (E.) Boyland, E. (Chester Beatty Res. Inst., London), E. R. Busby, C. E. Dukes, P. L. Grover and D. Manson. Brit. J. Cancer 18(3):575-581, 1964.

When magnesium stearate (MS), n-hexadecanol, n-octadecanol and naphthalene (NP) were tested for their suitability as a base for pellets implanted into the bladder of mice, tumor incidence of 5%, 12%, 26% and 4%, resp., indicated no advantage over cholesterol (tumor incidence, 12%). MS had the disadvantage that it formed chelates with compounds like o-aminophenols and 8-hydroxyquinoline; NP pellets disintegrated too rapidly. Compounds implanted in cholesterol pellets which produced a high incidence of bladder tumors (adenoma, carcinoma, papilloma) were 4-aminoantipyrene (33%), 4-acetamido-2'-hydroxy-6-methylazobenzene (33%), 4-dimethylamino-3-hydroxyazobenzene (36%), 2-acetamidonaphthalene (23%), bis-(2-amino-1-naphthyl) sodium phosphate (29%), 3-methoxyanthranilic acid (32%), hydroquinone (32%) and 2-fluorenylhydroxylamine (28%). Of the substances tested in pellets of stearic acid only 1-naphthylhydroxylamine and 2-naphthylhydroxylamine gave a higher incidence (31% and 56%, resp.) of tumors than stearic acid alone, and the data indicate that the use of this type of pellets was less sensitive than when cholesterol was used. When magnesium stearate was used as a vehicle, 1-methoxy-2-naphthylamine produced a significant number of tumors (26%). (See also CRA 1(5):#826, and #828, 1963; and *ibid.*, 3(4):#759, 1965.)

65-2139 FOLIC ACID REDUCTASES IN RELATION TO NORMAL AND MALIGNANT GROWTH. (E.) Braganca, B. M. (Dept. Enzyme Chem., Indian Cancer Res. Ctr., Bombay) and U. W. Kenkare. Acta Un. Int. Cancr. 20(4-5):980-982, 1964.

The activity of folic acid (FA) and dihydrofolic acid (DA) reducing enzymes was found to be reduced by 50% in hepatomas as compared to normal liver. Among the normal rat tissues examined only liver, kidney and intestinal mucosa were active. In embryonic tissue activity was the same as that in kidney. Experimental tumors (DAB-induced rat

hepatoma, transplanted Yoshida sarcoma, spontaneous C3H mammary tumors) showed 30% or less of the activity of normal liver. Livers of animals bearing DAB-induced hepatomas showed the same activity as those of normal controls. FA reductase activity was somewhat increased in regenerated liver during most of the periods studied, showing a max. increase of 35% at 72 hr. after hepatectomy. The present study shows that reducing enzymes are present in rapidly growing tissues.

65-2140 ENZYMATICAL AND HISTOCHEMICAL CHANGES IN EXPERIMENTAL HEPATOMAS. (E.) Raciu, E. C. (97 Independence Quay, Bucharest, Romania), F. Motoc, L. Georgescu and Constantinescu. *Acta Un. Int. Cancr.* 20(4-5): 1076-1077, 1964.

Rats treated with DAB were observed for 14-19 mo. until tumors occurred. During the first stage (0-8 mo.) there was the rapid appearance of hypertrophies (with swelling), variable nuclear lesions and epithelial regeneration which developed along with an excess of PAS positive material in the pericentral area of the liver along with a decrease in DNA. There were also decreases in dehydrogenases (pyruvic, succinic and malic), phosphatases (acid and alkaline) and an increase in aldolase. In the second stage (10-12 mo.) intense polymorphism, enlarged nucleic, hyperchromatic giant nucleoli, frequent karyolysis and karyopyknosis were seen along with atypical mitoses which occurred along with DNA excess, appearance of PAS negative material, an increase in dehydrogenases and a decrease in glucide synthesis. There also occurred a stimulation of protein and lipid synthesis. In the third stage (14-19 mo.) there occurred carcinomas (hepatocellular, biliary or epidermal) along with a marked excess of DNA and PAS negative material in oncocytes. After 14-15 mo. there was max. increases of most enzymes although aldolase and phosphatases increased. Various changes in mitochondria (which had started in Stage II) were noted.

65-2141 EXPERIMENTAL STUDIES ON SYNCARCINOGENESIS: II. ATTEMPTS TO INDUCE CANCER IN MICE BY SIMULTANEOUS APPLICATION OF URETHAN AND 9,10-DIMETHYL-1,2-BENZANTHRACENE. (Ger.) Schmähl, D. (Inst. Path., U. Bonn, Germany), Thomas and H. Brune. *Zschr. Krebsforsch.* 65(4):297-302, 1964.

Droplet application to the skin of urethan (U; 1.2 mg 2x/wk., total 1,560 mg in acetone) to 10 male and female C57 black mice resulted in "blood cysts" in the liver (BCL) in 84%, local cutaneous squamous epithelium carcinoma (CSEC) in 1 (2%), 3 (6%) showed lung adenoma or carcinoma of the lung (CL). In another group, following droplet application of 9,10-dimethyl-1,2-benzanthracene (DMBA; 0.0018 mg 3x/wk; total

0.0504 mg, in acetone) 1/42 mice developed hepatic spindle cell sarcoma and 4 (9.5%) CSEC after an av. of 732 days. Of 78 controls (treated with acetone only), 1 (1.3%) showed CL and 2 (2.6%) BCL. In 77 rats receiving DMBA + U, tumor yield did not increase, therefore there was no syncarcinogenesis. The incidence of leukemia and lymphoma in treated and controls was similar (18%-33% treated, 24% controls).

65-2142 AUTOANTIGENIC PROCESS DURING EXPERIMENTAL CANCERIZATION. (Fr.) Dufour, D. (Dept. Biochem., U. Laval Sch. Med., Quebec, Canada). Pp. 282-284 in *Proteins and Related Subjects*, V. 12. Protides of the Biological Fluids. Proc. XII Colloq. Bruges, 1964. Peeters, H. (Ed.). Elsevier Publ. Co., Amsterdam, 1965, 482 pp.

The autoantigenic reaction occurring between tissue extracts and serum of dimethylaminoazobenzene (DAB)- or 2-acetylaminofluorene (2-AAF)-fed rats (see also CRA 3(1):#53, 1965 and the following abstract) was found to occur naturally also in normal rats. Immunoelectrophoretic analysis of the process showed that the reaction occurred between a serum lipoprotein and a tissue constituent which behaved like a β -globulin. The degree of activity of this autoantigenic natural system appeared to be considerably increased during DAB or 2-AAF carcinogenesis.

65-2143 AUTOANTIBODY PRODUCTION DURING EXPERIMENTAL CANCERIZATION WITH 2-ACETYLAMINOFLUORENE. (Fr.) Dufour, D. (Dept. Biochem., U. Laval Sch. Med., Quebec, Canada). *Bull. Assn. Franc. Cancer* 51(2):283-286, 1964.

In 30-day-old Sprague-Dawley rats fed a diet containing 0.03% 2-acetylaminofluorene (2-AAF), an autoantigenic process was observed in the course of carcinogenesis which was characterized by an immunologic precipitation reaction between the liver, spleen, lung, kidney and thymus and the tumor. The serum of 2-AAF-fed rats showed an immunologic reaction with liver and spleen extracts of normal rats in an isologous system. (See also CRA 2(3):#501, 1964.)

65-2144 RESULTS OF DISTILLATION STUDIES ON SUPPLEMENTS TO TOBACCO PRODUCTS. PART 2. (POLYGLYCOLS, GLYCERIN). (Ger.) Kröller, E. (Fed. Board Health, Max von Pettenkofer Inst., Berlin-Dahlem). *Deutsch. Lebensmittelrundschr.* 61(1):16-17, 1965.

A study was made, under conditions similar to smoking, of the distillation products of the humidifying agents (glycerol and polyethylene glycol 400, 600 and 1,000) added to tobacco products. The distillation condensate of glycerol (calculated per 100 g of pyrolytically split substance (PSS)) contained 14.5 μ g of 3,4-benzpyrene

(BP), which amount was between that of 1,3-butylene and triethylene glycol. As to glycols (G), the BP content (calculated per 100 g of PSS) increases in the following order: diethylene G, triethylene G, polyethylene G 400, polyethylene G 600 and polyethylene G 1000. All G and glycerol had fluoranthene, pentacene, coronene and anthraquinone as pyrolysis products. Some distillation condensates contained tribenzpyrene, anthracene and 2,3-benzofluorene, and rarely traces of phenol substances. (See also CRA 2(8):#1468, 1964; *ibid.*, 3(2):#242, 1965.)

65-2145 ENZYMOLOGICAL STUDIES IN THE DEVELOPMENTAL PROCESS OF DAB HEPATIC CANCER.

(Jap.) Sato, S. (Dept. Med., Tohoku U. Sch. Med., Sendai, Japan). *Tohoku Igaku Zasshi* (Tohoku Med. J.) 67(5):597-620, 1963.

In Wistar male rats (210-280 g) fed 0.06% DAB, various liver and serum enzymes were measured throughout 4 histologically different phases in the course of development of liver carcinoma. The enzymatic activities including glutamic oxaloacetic transaminase (GOT), glutamic pyruvic transaminase (GPT), alkaline phosphatase (ALP), acid phosphatase (ACP), glucose-6-phosphatase (G6P), aldolase (ALD), and arginase (ARG) showed phase-specific patterns with a tendency to return toward the normal between phases. Some enzymes did not show this tendency before the third phase. The individual enzymatic activities, stated as the percentage level compared to the normal activity, were: in the first phase (disturbance in liver function)--liver GOT (67%), GPT (33%) G6P (33%), ALD (75%), ARG (25%), ALP (200%), serum GOT (600%), GPT (400%); in the second phase (fibrous proliferation)--liver GOT (67%), GPT (67%), G6P (33%), ALP (300%), serum GOT (600%), GPT (4200%); in the third phase (regeneration)--liver GPT (50%), G6P (67%), ARG (10%); in the fourth phase (development of hepatic carcinoma)--carcinoma-free liver tissue GPT (50%), G6P (50%), ALD (67%), ALP (200%), ACP (67%), cancerous liver tissue GOT (50%), GPT (11%), G6P (17%), ALD (50%), ARG (14%), ALP (300%), ACP (50%), serum GOT (200%), GPT (200%), ARG (25%).

65-2146 THE PRODUCTION OF LOCALIZED SARCOMAS IN THE RAT BY LONGTERM INTRAMUSCULAR INJECTION OF ORGANIC IRON PREPARATIONS IN THREE DOSAGES. (E.) Undritz, E. (Biol. Med. Res. Div., Sandoz Ltd., Basel, Switzerland) and B. Fraenkel. *Sangre (Barc.)* 9(3):437-440, 1964.

Various iron preparations (inulin, sinistrin, starch, 2 dextrans, 10 dextrans (manufactured by the authors) and 2 proprietary preparations (a dextran and a polyisomaltose)) were admin. i.m. to rats. After an excessively high dose of 20 mg Fe/animal (approx. 7 mg Fe/100 g/wk.) for up to 78 inj. to 212 rats, sarcomas developed in 80%, the first appearing after 3 mo. (13 inj., total 86.6 mg Fe/100 g) and the last appearing

260 days after treatment (78 inj.) was stopped; during this time all these animals were on a norm diet. When a dose (350 µg Fe/100 g/wk.) corresponding to the single therapeutic dose in man was admin. for up to 148 inj. to 256 rats, 19 developed localized sarcomas, the first appearing in 614 days (after 87 inj. = 30 mg Fe/100 g) and the last occurred after 3 yr. (122 inj. in 858 days = 42.7 mg/100 g). Of 244 rats admin. a subtherapeutic dose (70 µg Fe/100 g/wk.) up to 141 inj., only 2 developed sarcomas; the first developed within 949 days (91 days after the end of treatment with 122 inj. = 8.5 mg Fe/100 g). The rats in the last 2 groups also received a milk-semolina diet (poor in iron).

65-2147 THE DEVELOPMENT OF MAMMARY GLAND TUMORS IN RATS DURING ENDOCRINE REGULATION DISTURBANCES PROVOKED BY DIFFERENT ACTIONS. (Fr. Tourkevitch, N. M. (Ukrainian Sci. Res. Ctr. Exp. Clin. Oncol., Kiev, USSR), A. N. Gorevaia, L. K. Kounitsa and L. S. Mao. *Acta Un. Int. Cancr.* 20(6-7):1446-1449, 1964.

Chronic irritation of the ovaries in 3-month-old rats (provoked by ligation of one ovary with a silk thread) 4 wks. prior to treatment with weak doses of 9,10-dimethyl-1,2-benzanthracene (DMBA; 2 mg i.v. x 3 with intervals of 1 wk.; total 6 mg) increased the incidence (10/17 rats; 59.0%) of mammary gland tumors (MGT); admin. of the same dose of DMBA without ligation resulted in 2/22 rats (9.1%) with MGT; no tumors were seen in untreated, intact rats. In a second experiment, rats treated with DMBA (12 mg/rat) and subjected to prolonged CNS disturbances induced by a special electrode cell showed increased MGT incidence (15/16 rats; 93.7%), while those treated with DMBA alone showed a MGT incidence of 11/17 (64.7%); no tumors were seen in untreated, intact rats. In a third experiment, 6-8-week-old rats were inj. with CCl₄ (0.08 mg/100 g 2x/wk. for 11 mo.) and showed several mo. later cystic mastopathy (50/57 rats; 87.6%) along with permanent estrus (45/57; 78.9%) and uterine hyperplasia (11/57; 19.3%). In 35 rats surviving 16 mo. or more, tumors developed in various organs: breast (5); uterus (5); kidney (2); liver with metastases to epiploa and peritoneum (3); lung (1). The endocrine disturbances, although induced by various means, were attributed to increased FSH secretion in the pituitary.

65-2148 CHEMISTRY OF CHELATION IN CANCER. (E.) Furst, A. Charles C. Thomas (Publ.), Springfield, Ill., 1963, 143 pp., \$7.50.

This book presents support for the hypothesis that trace elements play an important role in the etiology as well as in the treatment of cancer. The nature of the complex ions formed by the transition elements, which are characterized by their variable oxidation states and their ability to form complex ions, and the nature of chelation

is reviewed as a preliminary to the consideration of the metals essential to life and of metal carcinogenesis. Various classes of carcinogenic agents are then discussed on the basis of the chelate hypothesis. Some carcinogens fit the demands of this hypothesis well, but others do not. The presence of chelating centers in the molecule is a characteristic of some of the more effective anti-cancer agents, although notable exceptions are mentioned. The role of trace metals in biological functions is reviewed and, finally, the relation of metals, chelation, carcinogenesis and cancer chemotherapy is discussed.

2149 STUDIES ON RIBONUCLEASE INHIBITOR IN NORMAL AND PRE-NEOPLASTIC LIVER TISSUE OF THE RAT. (E., Abstract, Ph.D. Thesis, U. Connecticut, 1964, 161 pp.) Wojnar, R. J. *Abstr. Abst.* 25(8):4395, 1965.

Using a modified assay system, a determination was made of the activities of ribonuclease (RNase) inhibitor and inactive RNase (i-RNase) in the supernates of rat liver during 2-acetylaminofluorene (AAF) feeding and in liver nodules induced by AAF. During AAF feeding, the specific RNase inhibitor activity showed a significant increase with a max. (100% greater than pair-fed controls) about wk. 12, while the specific RNase activity showed a decrease. The inhibitor activity in the liver nodules (at least 1 of which was a hepatoma) was not greatly different from adjacent liver or the control livers. The i-RNase activity was also similar both for the liver and resultant AAF nodules and for the control livers.

2150 RADIATION, URETHANE, AND A "TRANSMISSIBLE FACTOR" IN EXPERIMENTAL LEUKAEMOGENESIS. (E.) Berenblum, I. (Dept. Exp. Biol., Weizmann Inst. Sci., Rehovoth, Israel). *Int. J. Cancer* 20(4-5):893-898, 1964.

Various tissues of donor irradiated C57BL/6 mice were inj. 1 or 30 days after irradiation into recipient isologous mice. After an observation period of 88 wk., leukemia incidence was 51/262 (19%) and 46/269 (17%), resp. In similar groups, where urethane (U) treatment was begun 2 wk. after the radiation treatment, leukemia incidence was 1/334 (1%) and 8/348 (2%), resp. Leukemia incidence in U-treated mice previously inj. with non-irradiated tissues was 16/305 (5%). Incidence in U only controls was 5/110 (5%); that in untreated controls was 1/141 (0.7%). Therefore, irradiated tissues seemed to contain a "transmissible factor", which while itself incapable of inducing leukemia when transferred to normal mice, rendered the recipients liable to develop the disease by subsequent U treatment. This factor is presumably viral in nature, and the type of leukemia produced is, in some respects, similar to that induced by Gross and Moloney viruses. The possible nature of this "transmissible factor" is briefly discussed. Some of

the features of virus involvement in mouse leukemia are reviewed (27 references).

65-2151 SUSCEPTIBILITY OF THE HOST TO EXPERIMENTAL TUMOR. (Jap.) Shiomi, T. (Dept. Microbiol., Mie Pref. U. Sch. Med., Japan) and M. Mori. *Mie Igaku (J. Mie Med. Assn.)* 7(4):206-211, 1964.

In rats, oral admin. of 4-dimethylaminoazobenzene (DAB) resulted in the incorporation of DAB by liver protein and it induced carcinoma in the liver after 3 wk. During the precancerous period, along with morphological changes in the liver, the level of DNA and the number of biliary duct cells with an increased nucleus/cytoplasm ratio were elevated; at the same time, the relative number of parenchymal cells, the number of mitochondria in liver cells, and the level of succinic oxidase in the mitochondria were lowered. In parallel experiments on the transplantation of Yoshida sarcoma in rats and of Ehrlich ascites carcinoma in mice, it was found that tumor susceptibility was related to a certain blood picture pattern (the presence in the circulating blood of young neutrophils, plasma cells, more than 3.5% eosinophils, and more than 10% of monocytes) noted before tumor transplantation. This blood picture pattern in turn was correlated with the decreased level of succinic oxidase in the mitochondria. On the basis of these findings, the authors feel that the decrease in succinic oxidase level in mitochondria plays a part in tumorigenesis.

65-2152 CANCERS FROM AIR-REFINED AND STEAM-REFINED ASPHALT. (E.) Simmers, M. H. (Dept. Exp. Path., California Coll. Med., Los Angeles). *Industr. Med. Surg.* 34(3):255-261, 1965.

When C57 black mice were inj. s.c. with 200 mg of steam-refined asphalt (A), no cancers developed at the site of inj. but 1 animal developed an adenoma of the lung, whereas animals inj. with air-refined A showed a 13% tumor incidence (rhabdomyosarcomas or carcinomas) as well as lung adenomas. Weekly skin painting (22-270x) with air-refined A (75-100 mg) produced no cancers but 1 lung adenoma and 1 papilloma occurred. Steam-refined A painting (75-100 mg 3x/wk.) caused a 14% tumor incidence (all epidermoid carcinomas) after more than 153 paintings as well as 1 lung adenoma and 2 papillomas. When toluene was mixed with the air-refined A and painted 3x/wk. (total 284 paintings), a 45% tumor incidence (epidermoid cancers) with 2 lung adenomas and chronic dermatitis were noted, while the toluene painted controls showed no cancer, although 1 papilloma did occur.

65-2153 EFFECT OF COBALTOUS CHLORIDE ON THE MINIMAL CARCINOGENIC DOSE₅₀ OF METHYLCHOLANTHRENE IN ALBINO MICE. (E.) Kasirsky, G., R. F. Gautieri and D. E. Mann, Jr. *J. Pharm. Sci.* 54(3):491-493, 1965.

When CF-1 albino mice previously treated by 2 topical applications of methylcholanthrene (MC; minimal carcinogenic dose⁵⁰) were inj. i.p. with cobaltous chloride (2x/wk.; doses of 10, 25, 30 and 40 mg/kg) tumor incidences of 25%, 11% and 28% (2 trials), 20% and 14%, resp., were produced; the above doses inhibited tumorigenesis by 49%, 60%, 58% and 71%, resp., as compared to the MC only controls.

65-2154 TUMOR-SPECIFIC ANTIGENS IN PRIMARY DAB-INDUCED HEPATOMA AND MC-INDUCED SARCOMA OF RATS. (Jap., Abstract) Takeda, K. (Dept. Immunopath., Hokkaido U. Sch. Med., Japan), K. Kikuchi and T. Kodama. Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:137-138, 1964.

In order to investigate the antigenicity of DAB-induced hepatoma in Wistar/MK, Gifu, and Donryu rats and methylcholanthrene (MC)-induced sarcoma in Wistar/MK rats, insoluble lipoproteins (ILP) were extracted from tumor tissue and tumor-free tissue. The ILP were treated with trichloroacetic acid (TCA), cold acetone, or formalin before they were combined with Freund's adjuvant and inj. s.c. into Swiss mice. This was followed 4-5 wk. later by i.p. transplantation of ascites rat tumor cells. The results indicated that the ILP obtained from the tumor tissue itself had tumor specific antigenicity as manifested by its growth inhibitory effect. The ILP obtained from normal tissue failed to show such an effect. Furthermore, the ILP from DAB-induced hepatoma did not show an inhibitory effect on Takeda sarcoma and Usubuchi sarcoma; similarly the ILP from MC-induced sarcoma did not inhibit an ascites hepatoma. The ILP thus obtained lost their specific antigenicity when they were extracted with ether, ether-chloroform, ethanol, or deoxycholate, or when treated by heat (56°C for 30 min.) or by freezing. This indicated that the substance containing the antigenicity was the lipid. The antigenic substance was chemically impure, had a protein/crude fat ratio of 1:1.6, and contained almost no DNA. Electronmicroscopically, it was membranous and granular in structure presumably deriving from the membranous structure of the tumor cell or intranuclear insoluble substance.

65-2154A EXPERIMENTAL INDUCTION OF UTERINE CERVIX CARCINOMA AND ITS EARLY STAGES IN EXPERIMENTAL ANIMALS. (Ger.) Von Haam, E. (Ohio State U. Coll. Med., Columbus). Verh. Deutsch. Ges. Path. 48:57-74, 1964.

Following a review of the literature on experimental and spontaneous tumors of the uterine cervix in animals, the author discusses pathogenesis, pathologic anatomy, histopathology and

cytomorphology of uterine cervix carcinoma induced by 20-methylcholanthrene and 3,4-benzpyrene in mouse strains C3H, C57 and BDF-1. Effects of periodic withdrawal of carcinogens were also reviewed. The comparison of the pathogenesis, pathologic anatomy and biologic behavior of these tumors with human uterine cervix carcinoma shows a remarkable similarity in many ways, with the exception of metastasis and certain features in the ultrastructure of the cancer cell. (See also CRA 1(8):#1492, 1963.)

65-2155 A STUDY OF CORRELATION BETWEEN PROTEIN STRUCTURES AND HISTOLOGIC PICTURES IN DAB-INDUCED HEPATOMA. (Jap., Abstract) Takayanagi, I. (Inst. Clin. Med., Kurashiki Cent Hosp., Japan). Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:153-154, 1964.

Electrophoretic analysis of liver proteins in the course of development of DAB-induced hepatoma in rats indicated that fractions γ -gl. and β_2 -gl., which were prominent in normal liver, became gradually decreased during the development of hepatoma. β_1 -gl. (L_2), which was pronounced in normal liver, disappeared completely in hepatoma. There were several conspicuous abnormal factors (K_1 - K_4) distributed between β_2 -gl. and α_1 -gl. in hepatoma tissue. These abnormal protein fractions were absent in hepatoma-free tissue of the same liver. K_2 was also detected in the serum of hepatoma-bearing rats, indicating the shift of this factor into the circulating blood. Among these abnormal protein factors, K_2 was found to be most closely related to the hepatoma tissue.

65-2156 QUANTITATIVE SHIFTS OF NUCLEIC ACIDS DURING THE CARCINOGENIC PROCESS. (Jap., Abstract) Tamai, S. (Dept. Path., Hiro-saki U. Sch. Med., Japan), M. Sato and H. Takata. Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:152-153, 1964.

In albino rabbits (approx. 1 kg) which received daily topical application (ear) of 9,10-dimethyl-1,2-benzanthracene soln. (0.3% in benzene), quantitative estimation of nucleic acids (DNA) was made by measuring the area of cell nuclei of various layers of the skin which had been stained by the Feulgen method. After about 30 days simple carcinoma developed adjacent to the true skin and squamous cell carcinoma in the deep s.c. layers. The area of cell nuclei in the carcinoma lesion was approx. 3x as large as that of the skin in control animals. The amount of DNA was highest in the basal layer, next highest in the lower spindle layer and least in the upper spindle layer. The DNA conc. in these layers reached their peaks at 40 days, at which time the DNA conc. in the basal layer was almost 4-5x as high as the control level. The DNA conc. in the cancer lesion was equivalent to the DNA level in the lower spindle layer at 40 days.

See also abstracts nos.: 2095, 2101, 2181, 2187, 2207, 2209, 2246, 2247, 2248, 2255

VIRAL CARCINOGENESIS

157 OBSERVATIONS ON LATENT VIRUSES IN
M. RHESUS KIDNEY CULTURES. (It.)
Betta, N. (Inst. Hygiene, U. Parma, Italy).
Rev. Parmense 35(4):335-348, 1964.

Observations in primary kidney cultures of 34
rhesis monkeys revealed the presence of al-
tions due to 'monkey intranuclear inclusion
t' (MINIA) viruses (3/34), Foamy agent (3/34),
ses of the second (2/34) and third (2/34)
os of Hull, and hemo-adsorbing virus (1/34);
remaining monkeys presented no latent viruses.
virus was isolated in cultures from 26/34
als.

158 A PATHOLOGICAL STUDY OF CARCINOMA
INDUCED BY ADENOVIRUS TYPE 12. (Jap.)
sumi, K. (Dept. Path., Okayama U. Sch. Med.,
h), K. Iwata, T. Taguchi, M. Nanba and
ujii. Sogo Rinsho (Clin. All-Round) 14(1):
177, 1965.

Pathologic changes were observed in newborn
hamsters following i.p. or s.c. admin. of
ml of adenovirus 12 ($10^{2.5}$ TCID₅₀/0.1 ml).
r i.p. admin. tumor formation was first noted
wk. by microscopic and at 3 wk. by gross
ervation; in the case of s.c. admin., at 6-7
wk. The most striking change was the proliferative
inflammatory process observed in the subserosa and
muscular connective tissues. A series of
ical changes were observed to take place in
s resembling fibroblasts and which subse-
tly formed small nodules. Whether these
ges are directly related to the development
arcinoma or not was not confirmed. Serosa
s, intimal cells of vessels, muscle fibers,
oblasts, and fat blast cells were found not
e the tumor-inducing cells.

159 ISOLATION OF ADENOVIRUS FROM HUMAN
PULMONARY CARCINOMA. PRELIMINARY NOTE.
) Bronitki, A. (Inst. Inframicrobiol.,
nian Acad. Sci., Bucharest), R. Demetrescu,
opescu and A. Malian. Rev. Roum.
amicrobiol. 1(1):3-6, 1964.

CRA 3(3):#544; and ibid., (4):#811, 1965.

160 RESEARCH ON THE ETIOLOGY OF THE T8
ATYPICAL RAT EPITHELIOMA. (Fr.)
uet, J. (Dept. Microbiol., U. Caen, France).
Immun. (Paris) 28(4-5):205-236, 1964.

a long series of experiments using Wistar
, it is concluded that the T8 epithelioma
rin's carcinoma) in rats is a virus-induced
gnancy. Electron microscope studies have
aled the presence of viral-like corpuscles
in T8 tumors and in filtrates from the tumor
ts tissue cultures. Preliminary results show

that the inoc. of cell-free tumor filtrates is
followed in some instances by the appearance of
the T8 epithelioma; in one experiment involving
16 rats the following tumors were observed: T8
(2), muscular sarcoma (1), fibrosarcoma (1), and
rhabdomyosarcoma (1). A similar variety of tumor
types is observed with the use of T8 tissue cul-
tures.

65-2161 A STUDY OF CELL-FREE FILTRATES OF
YOSHIDA SARCOMA. (Jap.) Tsubura, Y.
(Dept. Path., Nara Pref. Coll. Med., Japan).
Sogo Rinsho (Clin. All-Round) 14(1):177-179, 1965.

In a reevaluation of the leukemogenesis due to
cell-free filtrates of Yoshida sarcoma, the author
inoc. a total of 14 newborn Donryu rats and a
total of 5 ddj mice (2-18 hr. old). None of the
animals developed leukemia during the 2-yr. period
of observation. Inoculation of cell-free fil-
trates into (dd0 x AKR)F₁ mice resulted in lym-
phatic leukemia in 9/14 (64%). This leukemia was
in turn transplantable to ddj mice in the form
of cell-free filtrates. Leukemia, however, also
developed in uninoculated (dd0 x AKR)F₁ (8/41, or
20%), uninoculated (AKR x dd0)F₁ (4/14, or 29%),
and (dd0 x AKR)F₁ inoc. with rat spleen tissue
homogenates (8/30, or 27%); none of these mice
were breast-fed with non-leukemic milk. This
indicated that the leukemia developing after
inoc. of cell-free filtrates of Yoshida sarcoma
was not due to leukemia viruses hypothetically
presumed to be present in the cell-free filtrates
but due to the leukemia viruses existing in the
(dd0 x AKR)F₁ mice. The higher incidence of leu-
kemia following inoc. of cell-free filtrates of
Yoshida sarcoma in the (dd0 x AKR)F₁ mice, as com-
pared with those of mice uninoculated or inoc.
with spleen cell-free filtrates, indicated the
presence of a leukemia-promoting factor in the
cell-free filtrates of Yoshida sarcoma.

65-2162 HISTOGENESIS OF VIRAL TUMORS. IX. AN
IMMUNOFUORESCENT STUDY ON INITIAL
CHANGES IN AKR MICE INOCULATED WITH POLYOMA VIRUS.
(E. & Jap., Abstract) Shimpō, K. (Dept. Path.,
Sapporo Coll. Med., Japan), H. Kinoshita,
I. Fukushima and S. Kasahara. Nippon Byori Gakkai
Zasshi (Trans. Soc. Path. Jap.) 53:133-134, 1964.

In AKR mice, the cellular responses occurring
during the initial one-month period after polyoma
virus inoc. included a dominant proliferation of
the stroma of the kidney at the corticomedullary
junction, accompanied by variable degeneration of
stromal cells. Later in this stage there was a
mild degeneration of the tubular epithelium and
perivascular infiltration of inflammatory cells.
By use of the fluorescent antibody technic,
these stromal cells showed some staining by day
5 and reached a max. at 2 wk. In the parotid
gland, a slight degree of proliferation of

intercalated ducts was observed. A few ductal cells, which were positively stained, underwent degeneration and became detached and rested in the ductal lumen. A small number of hyperplastic cells in the RES in the spleen and thymus were stained temporarily presumably due to viremia. In tissue cultures of infected mouse embryonic cells, the development of viral antigen took place prior to the onset of viral growth. The effusion of viral antigen from the nucleus to the cytoplasm was noted. *In vitro*, polyoma viruses proliferate predominantly in the nucleus.

65-2163 CHARACTERISTICS OF THE BIOLOGIC ACTION OF RNA ISOLATED FROM LEUKEMIC TISSUE. (Rus.) Butenko, Z. A. (Ukrainian Sci. Res. Inst. Exp. Clin. Oncol., Kiev, SSR). *Dokl. Akad. Nauk SSSR* 157(5):1245-1248, 1964.

RNA (0.2 ml), isolated from the leukemic tissue of a rat-transplantable strain of erythromyelosis, was inj. s.c. into 6-48-hour-old rats (Wistar and another albino strain). The results given pertain to 156 experimental and 80 control rats, which survived more than 6 mo. At the age of more than 3 mo., 37 rats showed a marked leukemoid reaction, usually of the myeloid type. In 5 rats, the tumorous form of myeloid leukemia was evident at the age of 6-7.5 mo. Various pathologic disturbances were found in 24 rats which died at the age of 3.5-7.5 mo., i.e., at the age when spontaneous tumors are practically never found; controls showed no pathologic changes at this time. In individual rats there were found a fibrosarcoma, a reticulocellular tumor and a growth upon the liver. Of 20 rats (mostly random-bred), which died or were sacrificed in the later stages of pregnancy, 11 showed fetal and uterine changes which were apparently related to disturbances of embryogenesis. Usually, one uterine horn showed a tumor-like formation containing embryos at various stages of disintegration or resorption. Such disturbances were not found in controls.

65-2164 A HETEROGENEITY OF ROUS SARCOMA VIRUS REVEALED BY SELECTIVELY RESISTANT CHICK EMBRYO CELLS. (E.) Vogt, P. K. (Dept. Path., U. Colorado Sch. Med., Denver). *Virology* 25(2): 237-247, 1965.

Batch no. 8 of the Rous sarcoma virus (RSV) was found to consist of 2 antigenically distinct variants, RSV-1 and RSV-2, and their resp. helper viruses, RAV-1 and RAV-2. RSV-2 (but not RSV-1) was immunologically related to the avian myeloblastosis virus (AMV). All tissue cultures from chicken embryos tested were sensitive to RSV-1, whereas about 40% proved resistant to RSV-2. These differences in growth patterns were controlled by the helper viruses. The helper viruses shared the antigenic makeup and the ability or inability to grow in chick embryo cells with their resp. RSV variants. The selective cellular

resistance to RSV-2 was probably of genetic origin and held also against the Schmidt-Ruppin strain of RSV and certain preparations of AMV.

65-2165 ANALYSIS OF THE DEFECTIVENESS OF ROUS SARCOMA VIRUS. III. DETERMINING INFLUENCE OF A NEW HELPER VIRUS ON THE HOST RANGE AND SUSCEPTIBILITY TO INTERFERENCE OF RSV. (E.) Hanafusa, H. (Dept., Exp. Med., Coll. France, Paris). *Virology* 25(2):248-255, 1965.

A second helper virus was isolated from Rous sarcoma virus (RSV) no. 8 stock and designated as RAV-2 (the original strain of RAV reported in CRA 2(2):#282, 1964 is now designated as RAV-1). RAV-2 and RAV-1 are antigenically unrelated. RAV-2 grows in cells of phenotype K but not in cells of phenotype K/2, whereas RAV-1 grows equally well in both cell types. RSV activated by RAV-2 is not susceptible to interference (with infection by RSV) imposed by RAV-1. It is concluded that the host range properties of RSV, its susceptibility to interference, and its antigenicity are determined by the helper virus and are therefore probably controlled by the virus coat. (For earlier studies, see CRA 2(1):#85; and *ibid.*, (2):#282, 1964.) (See also CRA 1(3):#506, 1963; and *ibid.*, 2(2):#283, 1964.)

65-2166 VIRUS PARTICLES IN B-16 AND S-91 MOUSE MELANOMAS AND THEIR SIGNIFICANCE. (E.) Channing, A. A. (Dept. Path., U. South. California Sch. Med., Los Angeles), T. Kasuga and H. B. Demopoulos. *Lab. Invest.* 14(2):219-230, 1965.

Electron microscopy of melanocytes from S-91 and B-16 melanomas in DBA/2 and C57 mice, resp., showed viral particles (type A) having an electron dense outer core with an inner core of lower electron density (av. 700-770 A) within the cisternae of the endoplasmic reticulum. All stages in the maturation sequence were seen. The morphologic evidence strongly suggests that these cell productions are viral life cycles.

65-2167 TRANSFORMATION OF BOVINE CELLS *IN VITRO* AFTER INOCULATION OF SIMIAN VIRUS 40 OF ITS NUCLEIC ACID. (E.) Diderholm, H. (Inst. Virol., U. Uppsala, Sweden), B. Stenkvist, J. Pontén and T. Wesslén. *Exp. Cell Res.* 37(2): 452-459, 1965.

When cells of bovine embryonic lung tissue in culture were inoc. with SV40 or viral DNA (made from a phenol extract of a high titer suspension of SV40) both the virus and the nucleic acid preparation induced proliferative morphological changes characteristic for SV40 transformation. In contrast, non-infected control cultures and cultures inoc. with a preparation of the nucleic acid exposed to DNase and maintained under the same conditions showed a regular fibroblastic growth. The transformed cells obtained by

atment with the nucleic acid are now in their
h passage and are still growing abundantly.
t of the attempts to isolate virus from the
nsformed cells were negative, but minute
unts of virus were recovered from occasional
sages.

2168 IMMUNOFLUORESCENT AND ELECTRON-MICRO-
SCOPIC STUDIES OF POLYOMA VIRUS IN
NSFORMATION REACTIONS WITH BHK21 CELLS. (E.)
ser, K. B. (Inst. Virol., U. Glasgow, Scotland)
E. M. Crawford. Exp. Molec. Path. 4(1):51-65,
5.

unofluorescent tracing of the adsorption stage
transformed BHK21 hamster kidney cells exposed
polyoma virus (titers over 10^{10} PFU/ml) showed
id virus ingestion and adsorption with the
us mostly retained in the cytoplasmic vacuoles;
e virus was transmitted to the daughter cells
at least 6 successive mitoses. Electron
icroscopy and recovery of virus-hemagglutinin
ported these conclusions. No ingested virus
seen in the cell nuclei. Three days after
ection new virus antigen appeared in a small
portion of the nuclei, increased in amount, and
read to the cytoplasm of the cells. Colonies
sing from individual polyoma-infected cells
owed similar results. The data are insufficient
establish any relationship between synthesis
antigen and transformation. (See also
A 3(3):#501, 1965.)

2169 ABERRANT CYTOPLASMIC STRUCTURES IN
AVIAN VIRUS TUMOR CELLS. (E.)
ne, U. (Dept. Surg., Duke U. Med. Ctr.,
ham, N. C.), R. A. Bonar and J. W. Beard.
Exp. Molec. Path. 4(1):81-97, 1965.

cells of avian virus-induced tumors (erythro-
asts of erythroblastic leukemia induced by
rain R, podocytes and sarcoma cells of a
hroblastoma induced by BAI strain A, strain
4 sarcoma cells, sarcomas in birds inoc. with
L 12 strain virus and lymphoid cells of lympho-
osis induced by RPL 12 virus), cytoplasmic
structures consisting of spherical bodies (30-40
diameter) of electron-dense material enclosed
a shell of higher density surrounded by an
definite outer zone with associated ribosome-
ke electron-dense bodies were seen. The
herical bodies resembled somewhat the immature
ian virus particles budding at the cell surface.
e structures were interpreted to be the result
abortive processes of cytoplasmic virus syn-
esis in the absence of components and conditions
r elaboration of the complete virus particle.
ee also CRA 1(5):#946, 1963.)

2170 PURIFICATION AND FINE STRUCTURE OF
KILHAM'S RAT VIRUS. (E.) Vasquez, C.
nst. Cancer Res., Villejuif/Seine, France) and
Brailovsky. Exp. Molec. Path. 4(1):130-140,
65.

When Kilham (K) rat virus obtained from newborn
hamster kidneys was purified and studied with the
negative stain method, the virus was found to have
a mean diameter of 18 μ , an angular profile and
seemed to be roughly hexagonal with concavities
and protuberances. The number of peripheral cap-
somes did not exceed 10. The authors note that
the most likely hypothesis is that the K-rat virus
is a pentagonal dodecahedron with 32 capsomeres.

65-2171 FURTHER STUDIES ON TRANSFORMATION BY
DNA FROM POLYOMA VIRUS. (E.)
Bourgaux, P. (Inst. Virology, U. Glasgow,
Scotland), D. Bourgaux-Ramoisy and M. Stoker.
Virology 25(3):364-371, 1965.

The conditions for the assay of transformation by
DNA extracted with phenol from polyoma virus (Weil
method) are presented. Using a modification of
the Montagnier and Macpherson agar suspension
method on BHK21/clone 13 cells, the number of
transformations was proportional to the dose of
DNA up to 1 μ g/2 million cells and corresponded
to 1 transformation/ 10^8 - 10^9 molecules. The
fast and slow components of DNA (separated by
band centrifugation) possessed transforming as
well as plaque-forming activity; the slow com-
ponent was less active in both functions. Heat
denaturation had little effect on plaque formation
and transformation by the fast component but it
reduced the activities of the slow component.
(See also CRA 2(6):#1141, 1964; ibid., 3(4):#860,
1965.)

65-2172 EXPERIMENTAL POLYOMA VIRUS TUMORS IN
RABBITS, HAMSTERS AND MICE. EFFECT OF
VIRUS PASSAGE IN MOUSE KIDNEY ON TUMOR FREQUENCY.
(It.) Terni, M. (Inst. Microbiol., U. Florence,
Italy) and I. Berdondini. Sperimentale 114(4):
159-175, 1964.

Polyoma virus strain 210-22 (infectious and HA
titers 5.4 and 64, resp.) grown in mouse embryo
cells was inoc. s.c. into newborn animals: tumors
were produced in 1/100 Swiss mice, 0/17 rabbits
and 12/14 hamsters with a latency of 7 mo. The
same virus, inoc. into newborn mice and recovered
10 days later from their kidney tissue culture,
showed a definite increase in infectious and HA
titers (6.0 and 256, resp.); it produced tumors
in 4/9 rabbits, 3/3 hamsters and in 27/58 mice
with a latent period of 2 mo. Mice also showed
increased mortality without tumors. Another
polyoma virus (strain 110-36) after a similar
passage in vivo in mouse kidney (infectious and
HA titers 6.7 and 1,024, resp.) produced tumors
in 4/4 hamsters, 1/3 rabbits and 32/68 mice.
Rabbit tumors were fibromas at the inoc. site.
Hamster tumors were mainly multiple. Mouse
tumors were mostly single and involved the salivary
glands in 28%-33% of the animals. Resistant fac-
tors may be involved in mice. The increased on-
cogenic activity, in the authors' opinion, is due
not only to an increase in the amount of virus inj.

but is also due to changes in the virus during passage through the kidney.

- 65-2173 A VIRUS ISOLATED FROM A MURINE RADIO-LEUKOSIS. (Fr.) Mouriquand, J. (Dept. Cell. Biol., Nucl. Stud. Ctr., Grenoble, France), C. Mouriquand, J. Darnault and M.-N. Grivet. C. R. Acad. Sci. (Paris) 260(10) (Group. 13):2952-2955, 1965.

A virus (R-10) has been isolated from a 3-month-old female virgin PS mouse with radiation-induced leukemia. Apparently different from other known spontaneous mouse viruses, R-10 has shown CPE on mouse embryo fibroblasts, HeLa cells and monkey kidney cultures. It is resistant to ether and destroyed by heating for 1 hr. at 56°C. Culture medium from different passages inoc. i.p. was fatal to newborn mice; in adult mice mortality was 48%. Hepatic necrosis and lymphoid depletion, sometimes accompanied by a reticuloplasmoblastic reaction of the spleen and lymph nodes, were observed in affected animals. Some survivors developed leukemias and mammary tumors. The initial cell-free extract produced 8 malignant tumors in 31 inj. animals with a latent period of 18.6 mo.; comparable were 5/19 and 15 mo., resp., for the first passage and 17/75 and 7.4 mo., resp., for subsequent passages. The oral admin. of culture medium to 13 one-month-old Balb/C mice was followed in 4/13 after 1.5 mo. by the appearance of splenic and lymph node reticuloplasmoblastic involvement, which was highly suspected of being malignant, and in 1/13 by generalized leukemia 2 mo. later. These results suggest that R-10 cultures are the vehicle for a carcinogenic virus which is probably associated with the cytopathogenic virus (agent of the hepatic necrosis and lymphoid depletion).

- 65-2174 PRODUCTION OF "TUMOR-SPECIFIC" ANTIGENS BY ONCOGENIC VIRUSES DURING ACUTE CYTOLYTIC INFECTIONS. (E.) Hoggan, M. D. (NIH, Bethesda), W. P. Rowe, P. H. Black and R. J. Huebner. Proc. Nat. Acad. Sci. USA 53(1):12-19, 1965.

Virus specific complement-fixing (CF) antigens are produced during early phases of the normal virus reproductive cycle in acutely infected cells. These antigens are soluble, but closely associated with cell or cell debris and are less stable than the antigens associated with the intact virus particle. In AGMK (primary and BSC-1) cells, acutely infected with SV40 (strain 776 or 777), in all instances the tumor antigen appeared prior to the viral antigen. Neither virion nor tumor SV40 CF antigens were found in primary hamster kidney cells during short term experiments (daily examination for 12 days).

- 65-2175 VIRUS-HOST RELATIONSHIP OF THE TUMOR-INDUCING VIRUS, POLYOMA: CORRELATIVE LIGHT, PHASE, FLUORESCENCE AND ELECTRON MICROSCOPE

STUDIES. (E., Abstract, Ph.D. Thesis, U. Texas 1963, 256 pp.) Bereczky, E. S. Diss. Abst. 25(4):2667, 1965.

A light, phase, fluorescence and electron microscopic study of mouse embryo cells grown *in vitro* and infected with polyoma virus (PV) showed the appearance of nuclear inclusions (1 or more dense bodies or a network of heavy strands of material which almost completely filled the nucleus) on 3 or 4 of infection. The viral nature of the inclusions was revealed by enzymatic digestions with pepsin and DNase. Both types of inclusions showed characteristic 270 A PV particles which were occasionally in the cytoplasm and outside the cell. Hamster embryo cells infected with PV *in vitro* yielded virus, although there was no morphologic or cytochemical evidence of virus activity. PV was produced *in vitro* from cell cultures of PV-induced parotid gland tumors, some cells of mouse s.c. tumors, but not from cells of hamster s.c. tumors; the latter cells appeared to produce some material (interferon) which provided some protection against the activity of PV on mouse embryo cells.

- 65-2176 SPECIFIC COMPLEMENT-FIXING ANTIGENS IN POLYOMA TUMORS AND TRANSFORMED CELLS. (E.) Habel, K. (NIH, Bethesda). Virology 25(1):55-61, 1965.

The presence of complement fixing (CF) antigen was demonstrated in a polyoma-induced hamster tumor and in 2 different polyoma mouse tumors. The specificity of the demonstrated antigen was apparent since tests against hamster tumors induced by SV40, adeno 12 and 18 viruses, as well as normal hamster or mouse tissues, or methylcholanthrene-induced tumors were all negative. The tumors induced by the other viruses were positive for their own specific CF antigens when tested against sera from hamsters bearing them. The presence of antigen was not related to the presence or absence of infectious virus in carrier cultures nor to the ability of the infected cultures to produce tumors when 5×10^6 cells were inoc. s.c. into whole body X-irradiated adult mice or unirradiated adult hamsters. Tumor-bearing mice and hamsters had sera with high CF titers against tumor antigen but were negative for antiviral antibodies. Antiviral sera having high titers of antiviral antibodies were negative in the CF test against tumor antigen. The data suggest that the transplanted and CF antigens in polyoma tumors are not the same, and that neither represents virus antigens as such.

- 65-2177 THE ROLE OF VIRUSES IN CARCINOGENESIS. (E.) Rottino, A. (Hodgkin's Dis. Res. Lab., St. Vincent's Hosp., New York, N. Y.), J. Angers and B. A. Briody. Industr. Med. Surg. 34(3):262-268, 1965.

In a review (67 references) of the induction of cancer by viruses, the authors present data on

the existence of a latent virus in newborn C3H(f) bred mice as shown by a positive HAI antibody test in 103/141 (76%) mice given s.c. TFA (unknown substance) prepared from serum of 6 cancer mice. (3 Hodgkin's; 2 carcinoma; 1 lymphosarcoma) compared to a positive HAI of 38% (56/145 animals) for mice receiving TFA from non-cancer mice. Of mice receiving a fraction from which the A component of TFA was removed, none developed antibody. The authors then posed various unanswered questions such as: why do tumors in these animals fail to arise spontaneously; why is there a low incidence of tumor induction when there is a high incidence of activation, etc.

2178 THE EFFECTS OF ROUS SARCOMA AND INFLUENZA A VIRUSES ON CHICKEN EMBRYONIC LIMB BUDS GRAFTED ONTO THE CHORIOALLANTOIC MEMBRANE. (E., Abstract, Ph.D. Thesis, Rutgers U., New Brunswick, N. J., 1964, 84 pp.) Dunkel, V. C. ss. Abst. 25(4):2172, 1965.

Chicken embryo 3-day-old leg buds were infected with Rous sarcoma virus (RSV) and then grafted to the chorioallantoic membrane of 9-day-old eggs. Histological examination of the RSV-infected leg buds showed tumor foci and hemorrhage

in all the limbs by day 5 and by day 9 after transplantation, 50%-70% of the limbs were dead. The limbs surviving after 9 days showed massive areas of hemorrhage and tumor cells with small rudimentary elements of cartilage. Although the 3-day-old limb buds were bathed in a potent anti-RSV immune serum following exposure to RSV, it was evident that the RSV spread from the infected leg bud to the embryo and from there to the chorioallantoic membrane. A similar study was done with influenza A virus.

65-2179 VIRUS-LIKE PARTICLES ASSOCIATED WITH CHLOROLEUKEMIA IN THE RAT. (E.)

Weinstein, R. S. (Mixer Lab., Massachusetts Gen. Hosp., Boston) and W. C. Moloney. Proc. Soc. Exp. Biol. Med. 118(2):459-461, 1965.

Electron microscopic study of chloromas from non-inbred Wistar rats showed electron dense virus-like particles in the intercellular spaces. These particles were approx. 70 m μ in diameter, some appeared hexagonal in shape and may have had tail-like structures. Their distribution was similar to that reported for the murine leukemia viruses.

See also abstracts nos.: 2096, 2101, 2102, 2105

EPIDEMIOLOGY AND BIOMETRY

- 65-2180 ON THE DISTRIBUTION OF HUMAN TUMOURS IN ERITREA. (E.) Sforza, M. (Inst. Path. Anat., U. Rome). Path. Microbiol. (Basel) 27(5):952-955, 1964.

Biopsy specimens of 1,016 malignancies in Eritrea (662 from Africans, 354 from Europeans) showed a prevalence of cancer of the thyroid, liver, connective tissue and skeleton among the Africans and of cancer of the skin, larynx, pharynx, breast and bladder among the Europeans. Among the Eritreans, the epithelial:mesenchymal tumor ratio was 2, epithelial:connective tissue tumor ratio was 3.1, indicating a high incidence of mesenchymal and connective tissue tumors compared to the Europeans (resp. tumor ratios 4.1 and 10). Studies on 383 cases revealed that 85%, 6%, and 9% came from the highlands, middle and lowlands, resp. These differences in distribution were probably related to the location of the hospital and greater exposure in the highlands to cosmic, UV, and other radiations. The tumors among the Eritreans were highly varied as to histologic type.

- 65-2181 ON THE QUESTION OF THE ORIGIN OF BRONCHIAL CANCER. DID WE DISCOVER THE CAUSE IN CIGARETTE SMOKING? (Ger.) Schmidtmann, M. Path. Microbiol. (Basel) 27(5):935-942, 1964.

In a comparative study of geographic distribution, while bronchial cancer (BC) was found in most countries studied, the frequency varied widely. In the last decades a marked increase in BC was found in countries with heavy industrialization. This increase began 10 yr. after the influenza epidemic of 1918 in all the countries where the epidemic was present. Due to the continued increase in BC, however, it is doubtful that the influenza-conditioned epithelial metaplasias served as a starting point for cancer development. Cigarette smoking as a cause for BC was studied in various countries. No BC was found in Amazonian Indians and Eskimos although they are heavy smokers. In Asiatic countries, despite heavy smoking, BC frequency was not the same as in industrial countries of Europe and North America. In the former heavy industry is absent and most of the population work the land; these areas were not seriously effected by the influenza epidemic in 1918. Therefore, the increase in BC is only found in industrialized countries. This does not negate the possibility that the chronic bronchitis of a chain smoker could promote the development of BC in a man who is exposed to industrial toxins.

- 65-2182 PRIMARY CANCER OF THE LIVER IN GREECE. (E.) Symeonidis, A. (Dept. Path., Aristotelian U., Thessaloniki, Greece). Path. Microbiol. (Basel) 27(5):931-934, 1964.

Among 7,462 autopsies (4,953 men, 2,509 women) performed in Greece, 1,278 malignancies (889 men, 389 women) were seen, including 164 liver carcinomas (132 men, 32 women). These data show a significantly higher frequency of primary liver carcinoma in Greece than in Western Europe or the USA. It is concluded that malnutrition and infectious hepatitis may be contributing factors in Greece. Malnutrition, bilharziosis, and infectious hepatitis are also considered etiological factors for the striking frequency of liver carcinoma in Africa, particularly among the Bantus.

- 65-2183 EXAMINATION OF THE RESIDENCE OF LEUKEMIC CHILDREN. (Ger.) Fischer, F. (Inst. Child Care, U. Rome). Path. Microbiol. (Basel) 27(5):767-771, 1964.

See CRA 3(2):#355, 1965.

- 65-2184 UTERINE DOUBLE CARCINOMAS. (Ger.) Jopp, H. (1st Clin. Gynec., U. Munich, Germany) and H. A. Krone. Geburtsh. Frauenheilk 24(12):1067-1078, 1964.

Between 1954-63 five cases of double primary carcinoma (DC) of the uterus were found among 5,000 squamous cell carcinomas of the cervix and 1,000 corpus uteri (CU) adenocarcinomas. In 4/5 postmenopausal pts. (av. 64.2 yr. of age), DC occurred concomitantly and in 1/5 at a 3-year-interval. In none of the cases could CU carcinoma be regarded as radiation-induced. It is suggested, that CU carcinoma could develop after inadequate radiotherapy of cervical cancer.

- 65-2185 JNII-ABCC LIFE SPAN STUDY. MORTALITY OF A-BOMB SURVIVORS, HIROSHIMA AND NAGASAKI. REPORT 2. (Jap.) Jablon, S., Y. Ishida and G. W. Beebe. Hiroshima Igaku (J. Hiroshima Med. Assn.) 17(10):1156-1180, 1964.

In a survey of deaths in Hiroshima and Nagasaki between 1950-59, a total of 64 cases of leukemia were collected. Eighteen occurred in individuals exposed to the atomic blast within 0-1,999 m of the hypocenter. The incidence of leukemia was judged to be extremely high in those exposed within 0-1,399 m of the hypocenter. The overall incidence of leukemia in Hiroshima and in Nagasaki were 20 and 18, resp., per 100,000 as compared with 2.5 among the general population in Japan for 1956. In regard to deaths due to malignant tumors other than leukemia, women showed significantly higher rates particularly among those exposed within 0-1,399 m in Hiroshima and those exposed within 2,000-2,499 m in Nagasaki. This increased incidence in women was primarily due to an increase in carcinoma of the stomach and partially due to an increase in carcinoma of the uterus. The incidence of malignant tumors was slightly lower

among the non-exposed. The incidence of malignant tumors did not appear to be correlated with the appearance of acute radiation symptoms.

65-2186 LUNG CANCER AND SMOKING IN SWITZERLAND. ANALYSIS OF SMOKING HABITS OF ALL LUNG CANCER DEATH CASES IN SWITZERLAND, 1951-1960. (Ger.) Abelin, T. (Inst. Hyg., Eidgenossischen Tech. Coll., Zurich, Switzerland). Schweiz. Med. Wschr. 95(8):253-259, 1965.

Cigarette smokers showed increased lung cancer mortality paralleling the general increase of cigarette production whereas cigar and pipe smokers showed rather constant trends. Among the bronchial carcinoma deaths, 6,386/7,789 men and only 99/1,050 women were smokers. Among men, 2,692/6,386 (42.2%) were cigar and pipe smokers. These data are comparable to those in Germany and The Netherlands, whereas in 9 other countries a greater predominance of cigarette smokers prevails among the lung cancer pts. The actually recorded lung cancer mortality was much lower than that estimated on the basis of tobacco production and allowing for changes in age distribution of the population.

65-2187 SMOKING HABITS AND DISEASE IN OHIO. (E.) Hammond, E. C. (Am. Cancer Soc., Inc., New York, N. Y.) and L. F. Gerber. Ohio Med. J. 61(2):134-137, 1965.

Smoking habits of 35,063 Ohio men aged 40-89 yr. are reported in relation to their physical complaints when enrolled in the survey, and to their mortality and hospitalization histories during the 34.4 mo. of this study. In comparison to nonsmokers, the smokers had more frequent physical complaints (particularly cough, short breath, loss of appetite), more frequent hospitalization, and higher mortality. These 3 factors increased with the number of cigarettes smoked/day, degree of inhalation, and early start of the smoking habit. There were 58 lung cancer deaths (3 nonsmokers, 5 pipe or cigar and 50 cigarette smokers). Deaths due to emphysema and coronary artery disease were higher among cigarette smokers than nonsmokers. It is concluded that cigarette smoking constitutes a major health hazard. (For related studies, see also CRA 2(2):#181; ibid., (7):#1368, #1369 and #1370, 1964; ibid., 3(3):#456, #592 and #598; ibid., (4):#912 and #913; and ibid., (5):#1245, 1965.)

65-2188 COHORT ANALYSIS OF THE MORTALITY DUE TO MALIGNANT TUMORS OF THE RESPIRATORY SYSTEM IN ITALY. (It.) D'Alfonso, G. (Dept. Phthisiol., U. Naples, Italy) and C. Biscione. Arch. Tisiol. 19(11):904-922, 1964.

The application of cohort analysis to the study of lung cancer mortality in Italy from 1931-60 gave results which were completely different from

those obtained with conventional statistical methods. According to the latter, lung cancer mortality is much higher in people <70 yr. old than in people above this age, with max. frequency between 60-64 yr. Cohort analysis gave, instead, a curve in which lung cancer mortality values increased continuously with increased age. These results confirm those obtained by other investigators for other countries.

65-2189 FREQUENCY OF ABO BLOOD GROUPS IN MENINGIOMAS. (It.) Iraci, G. (Inst. Neurosurg., U. Padua, Italy) and G. G. Toffolo. Tumori 50(6):473-475, 1964.

A statistical analysis of ABO blood groups was carried out in 470 pts. with meningiomas who were operated upon for the first time at the Institute. The frequency (%) of blood groups O, B, AB, and A, resp., was 39.15, 14.9, 4.25, and 41.7. In 1000 controls the values were: 45.7, 9.3, 4.5, and 40.5. The increased frequency of the B group among meningioma pts. is considered statistically significant. (See CRA 3(2):#352, 1965.)

65-2190 ABO BLOOD GROUPS AND CARCINOMA OF PANCREAS. (E.) Macafee, A. L. (Dept. Path., Queen's U., Belfast, Ireland). Ulster Med. J. 33(2):129-131, 1964.

Blood group distribution in 119 pts. with carcinoma of the pancreas and 11,327 controls was, resp., A, 30.26% and 37.01%; O, 47.08% and 48.75%; B + AB, 22.66% and 14.24%. Therefore, pts. with carcinoma of the pancreas had a deficiency of blood group A and an excess of blood groups B + AB.

65-2191 ORIGIN AND DEVELOPMENT OF SKIN MELANOBlastoma ON THE BASIS OF 300 CASES. (E.) Trapl, J. (Dept. Derm., Charles U., Prague), L. Paleček, J. Ebel and M. Kučera. Acta Dermatovener. (Stockholm) 44(5):377-380, 1964.

Among 300 cases of melanoblastoma, 122 (40.7%) originated from spotted nevi present since childhood, 34 (11.3%) from spots arising only in adult age, 81 (27.0%) from melanosis Dubreuilh, 17 (5.7%) "de novo" from normally pigmented skin; no reliable data could be obtained on 46 cases. It was observed that the rapid vertical tumor growth lasting only several mo. is preceded by a long period (1 or several yr.) of initial changes (mostly horizontal enlargement with inconspicuous surface changes). (See also 1(7):#1393, 1963.)

65-2192 MALIGNANT NEOPLASMS OF THE SKIN. (E.) Reddy, D. J. (Dept. Path., Andhra Coll. Med. Visakhapatnam, India) and K. V. Rao. Indian J. Derm. Vener. 30(2):43-54, 1964.

An analysis of malignant skin tumors (MST) at the Department of Pathology, Guntur Medical College,

for the period 1955-62 showed 132 (4.2%) MST out of a total of 3,083 malignant tumors. More than 50% of the MST were squamous cell carcinoma (76 cases; 47 males, 29 females; age <10-70 yr.). Many were secondary to trauma, friction burns, or actinic ray exposure. Various types of basal cell carcinomas were found in 21. There were 20 cases of malignant melanoma; trauma was involved in 80% of barefooted individuals. Distribution by site for MST is tabulated for squamous cell and basal cell carcinoma and for malignant melanoma; some detailed case histories are presented.

- 65-2193 COMPARISON OF MORPHOLOGIC FEATURES OF BRONCHIAL CARCINOMAS WITH SILICOSIS AND THE LIMITATIONS IN APPLICATION OF STATISTICAL METHODS. (Ger.) Knopp, J. (Inst. Path., Gelsenkirchen, Germany). *Mitt. Ges. Bekampf. Krebs. (Nordrhein-Westf.)* 3(4):567-590, 1964.

Tabulations of size, location, and histologic type among 1250 cases of bronchial carcinoma showed no significant relationship to age grouping; however, a possible relationship to silicosis and dust exposure could not be excluded. (See also CRA 2(1):#142, 1964.)

- 65-2194 BLOOD GROUPS, GASTRODUODENAL ULCER AND MALIGNANT TUMORS (STOMACH, COLON-RECTUM, BREAST AND OTHER LOCALIZATIONS). (It.) Benbanaste, M. *Quad. Chir.* 7(3):267-279, 1964.

ABO blood group distribution was studied among 807 pts. with cancer of the stomach (306), colon and rectum (173), breast (211) and other localizations (117). There was an increased frequency of O blood group in subjects with cancer of the breast and colon and rectum which was statistically significant. The frequency (percentage) of blood groups A, B, AB, and O was 41.04, 17.34, 2.32, and 39.3, resp., for colonic and rectal cancer; and 35.07, 14.22, 0.95, and 49.76, resp., for mammary cancer. In 8,674 controls comparable values were: 44.19, 14.35, 6.83 and 34.63, resp.

- 65-2195 EXTENT OF POST MORTEM EXAMINATIONS OF THOSE DECEASED WITH MALIGNANT NEOPLASMS IN THE CSSR. (Cz.) Wunder, R. (Dept. Health, Comenius U. Sch. Med., Bratislava, Czech.), A. Volná and A. Hudák. *Cesk. Zdrav.* 12(10):501-509, 1964.

Deaths due to neoplasms in 1960 are tabulated according to age groups, showing that a total of 25,158 deaths occurred in the CSSR (20,054 in the Czech region; 5,113 in Slovakia) between the ages of 0-85+ yr. About 3000 deaths occurred before the age of 50 yr. Since the autopsy rate was only 31% in this study, the authors recommend compulsory autopsies for all persons who die under the age of 50 yr. due to malignant tumors. (See also CRA 1(7):#1401, 1963.)

- 65-2196 ESTIMATION OF INCIDENCE OF MALIGNANT TUMORS IN RELATIONSHIP TO THE AGE STRUCTURE OF THE POPULATION. (Cz.) Brückner, L. (Dept. Oncol., State Hosp., Paskov, Czech.). *Cesk. Zdrav.* 12(6):323-326, 1964.

Tabulation of tumor incidence for 1960-62 shows a range of 0.18%-0.315% among 10 districts in Czechoslovakia whereas the national figure amounts to 0.252%. The latter figure is inaccurate for use in the various districts, where the age structure of the population differs and must be taken into account.

- 65-2197 CANCER FREQUENCY IN COSTA RICA. A REVIEW OF 3,000 AUTOPSIES. (Sp.) Mena Solera, H. (U. Costa Rica Sch. Med., San Jose). *Acta Med. Costarric.* 7(1):19-26, 1964.

Of 3,000 pts. autopsied at the San Juan de Dios Hospital during 1957-62, 435 (14.5%) had cancer. This gave an av. of 90 cases/yr. and represented more than 10% of the cancer mortality in the whole country (863 cases/yr.). Data from this series could therefore be generalized to the total population. The most frequent localizations were carcinoma of the stomach (28%), uterine cervix (8%), liver (5.7%), bronchus (4.4%), pancreas (3.6%), breast (2.5%), esophagus (2.5%), prostate (2%); acute leukemia (4.4%); lymphosarcoma (3.6%), glioma (2.8%). The highest incidence was observed in the 50-59 and 60-69 yr. age groups. Geographical distribution of cancer is also presented by province.

- 65-2198 MALIGNANT TUMORS IN THE AUTOPSY MATERIAL OF THE DEPARTMENT OF PATHOLOGICAL ANATOMY OF THE MEDICAL ACADEMY IN CRACOW IN THE YEARS 1939-1958. I. (E.) Kulig, A. (Dept. Pat. Anat., Cracow Med. Acad., Poland), W. Jaszczyk and R. Perski. *Acta Med. Pol.* 5(2):119-138, 1964.

Among a total of 24,490 autopsies (13,677 males (M), 10,813 females (F)) performed at the Medical Academy in Cracow (1939-58) 2,195 (8.96%) were carcinoma (1191 M, 1004 F); 167 cases (0.68%) were sarcoma or other nonepithelial malignant tumors (90 M, 77 F); and 550 cases (2.29%) were proliferative diseases of the hematopoietic system and RES (366 M, 184 F). The highest incidence of deaths from carcinoma and sarcoma occurred at 51-60 yr. Sarcomas were localized most frequently in the skeletal system. The compiled data were compared to that of other authors, including that of Ciechanowski (of the same department) for the yr. 1890-1938. In comparison to this latter work the frequency of gastric cancer in both sexes has declined two-fold in this period, whereas the frequency of bronchial cancer has increased. Uterine cancer decreased in the last decade from 35.46% to 17.21%. A total of 526 tumors of the central nervous system was excluded from the evaluation because the presence of a large neurosurgery center in Cracow might have rendered their number disproportionate.

5-2199 MORBIDITY IN THE MEXICAN ARMY. (Sp.)
De La Loza, S. A. and J. Herrera
González. Rev. Sanid. Milit. (Mex.) 18(3):
124-148, 1964.

In 1963, among 20,129 people hospitalized in
military hospitals in Mexico, 676 (3.3%) were
affected by tumors (339 malignant, 323 benign,
4 unidentified). Among 13,414 paramilitary
people and civilians, tumor incidence was 3.8%.
The distribution by site of the 339 malignant
tumors was: breast and genitourinary tract 198
85 uterine cervix, prostate 26, breast 26,
female genital extrauterine 29, kidney 12,
ladder 11, others 9); digestive tract and peri-
toneum 52 (stomach 25, biliary tract and liver
5, pancreas 6, intestine 4, peritoneum 2);
respiratory system 25 (bronchi and lungs 16);
lymphatic system and hematopoietic organs 25;
oral cavity and pharynx 3; other sites 36. An
analysis of the first 4 main causes of hospitali-
zation showed tumors to be in first place for
5-65-year-old women (18.3%), and in second place
for 45-64-year-old-men (7.4%), 25-44 yr. old
women (5.2%) and in women >65 (10.0%).

5-2200 EPIDEMIOLOGIC AND CLINICAL CONSIDERA-
TIONS ON CANCER IN CHILDREN. (Sp.)
Zuckermann, C. (Nat. Cancer Inst., Mexico City,
Mexico). Rev. Mex. Cir. Ginec. Cancer 32(8):
227-234, 1964.

In a brief review (4 references) stressing the
increasing importance of cancer in children, the
author reports that at the Children's Hospital of
Mexico a total of 826 malignant tumors and 363
leukemias were observed during the period 1959-63.
While the number of malignant tumors varied be-
tween 150-190/yr., the number of children with
leukemia increased from 50 in 1959 to 89 in 1962
and 100 in 1963 (probably in relation to improved
diagnostic methods).

5-2201 PREGNANCY AND CANCER OF THE UTERINE
CERVIX. (Sp.) Zuckermann, C. (Nat.
Cancer Inst., Mexico City, Mexico). Rev. Mex.
Cir. Ginec. Cancer 32(6):163-170, 1964.

In a paper devoted mainly to diagnostic and ther-
apeutic problems, the author reports an incidence
of 1 pregnancy among 600 cases of cervical car-
cinomas. Comparable values for the National
Institute of Cancerology were 1/350. Lower in-
cidence were observed in obstetrical departments:
in both the General Hospital of Mexico City and
the Mexican Institute of Social Security there
was one cervical carcinoma per 5,600 pregnancies.

5-2202 CONTRIBUTIONS OF END RESULTS DATA TO
CANCER EPIDEMIOLOGY. (E.) Haenszel,
W. M. (NCI, Bethesda). Nat. Cancer Inst. Monogr.
(15):21-33, 1964.

The high and low incidence areas for various

cancers were as follows: esophagus, Finland
(1953-56) was high and Norway (1953-56) and
Connecticut (Conn.; 1950-54) were low; stomach,
Finland or Norway were high and Conn. low; colon,
Conn. and Denmark were high and Norway and Finland
were low; rectum, Conn. and Denmark were high and
Norway and Finland were low; lung and bronchus,
England and Wales (1952-53) and Finland were high
and Norway was low; breast, Conn., England and
Wales and Norway were high and Finland was low;
cervix, Conn. and Denmark were high and Norway
and England were low. When the incidence and
survival rates were compared, they varied directly
for 3 sites (colon, rectum and cervix), showed an
inverse relationship for 3 sites (esophagus,
stomach and lung) and showed no consistent pattern
for 1 site (breast).

65-2203 THE FREQUENCY AND OPERABILITY OF
PATIENTS WITH UTERINE CARCINOMA IN THE
OBSTETRIC SCHOOL OF CATANZARO 1950-1960. (It.)
Frontera, F. (U. Naples, Italy). Arch. Ostet.
Ginec. 69(4):327-346, 1964.

Of 3,476 pts. hospitalized during 1950-59, 232
(6.6%) had cancer of the uterus which involved
the cervix in 190 (5.46%) cases and the body in
42 (1.2%) cases. The highest incidences for both
localizations were observed in the 40-49 yr. age
group with 42.9 and 45.3%, resp. In the 2 groups,
94.21 and 92.86%, resp., were married; 67.9 and
61%, resp., were premenopausal.

65-2204 EPIDEMIOLOGIC STUDY OF LEUKEMIA IN
CHILE. (Sp.) Meza, C. (Dept. Med., U.
Chile Sch. Med., Santiago), F. Massad, C. Larrain
and J. Moróder. Rev. Med. Chile 92(9):725-731,
1964.

In Chile during 1959-61 the av. leukemia mortality
was 240.7 cases/yr., equivalent to 3.1/100,000
population/yr. (3.5 in men and 2.8 in women).
Very similar figures were obtained for incidence
of leukemia: 229.7 new cases/yr., equivalent to
3/100,000 population/yr. (3.4 in men and 2.5 in
women). This low value for leukemia frequency
(as compared with other countries) was considered
to be real and not due to poor diagnostic methods.
Both leukemia mortality and incidence were higher
in men than in women for all age groups, even in
children 5-9 yr. old, where the exposure factor
should be the same in both sexes. For all leukemia
age distribution showed a bimodal curve with a
peak at 0-9 yr. and a second peak at 40-59 yr.
When related to the number of people in each age
group, the first peak disappeared because of the
high proportion of young people in the population.

65-2205 EPIDEMIOLOGY OF CANCER IN VIET NAM.
(Fr.) Pham-Bieu-Tam (U. Saigon Sch.
Med., South Viet Nam) and Dao-Duc-Hoanh. Med. Afr.
Noire 9(11):423-426, 1964.

Of 4,132 cases of cancer hospitalized in the major

antitumor centers of Saigon during the yr. 1956-61, 1,401 (33.9%) occurred in men and 2,731 (66.1%) in women. The cancer distribution by site was as follows: mouth 715; pharynx 390; digestive tract 434; liver 91; respiratory system 179; breast 287; female genital tract 1,438; male genital tract 132; other sites 466. In men, the incidence (percentage) by site was: mouth 22.2 (tongue 8.2); pharynx 20.2 (nasopharynx 12.6); digestive tract 18.8 (stomach 11.1); urogenital tract 9.3; and respiratory system 8.9. In women, the percentage incidence was: genital tract 52.7 (uterine cervix 47.2); mouth 14.7; breast 10.1; digestive tract 6.2 (stomach, 3.1); pharynx 3.7 (nasopharynx 2.3); and respiratory system 1.9. (See also CRA 1(3):#519, 1963.)

- 65-2206 BASAL CELL CARCINOMAS IN WOMEN. (E.)
Hawtof, D. (Dept. Plast. Surg., Grace Hosp., Detroit, Mich.) and W. A. Lange. Grace Hosp. Bull. 43(1):33-41, 1965.

Among 136 female pts. seen between 1954-64 who had basal cell epithelioma, 10 had been given X-irradiation treatments for hirsutism or acne; only 2 admitted to excess sun exposure. Age range was 20-90 yr. (97 cases, 40-70 yr.). Most of the tumors were on the face (85%); the majority of these were in the middle third.

- 65-2207 SMOKING AND HEALTH. (Ser.) Kesić, B.
(Andrija Stampar Sch. Public Health, U. Zagreb Sch. Med., Yugoslavia). Liječn. Vjesn. 86(11):1325-1340, 1964.

A critical review of the U. S. Surgeon General's report "Smoking and Health" (the Terry Report) is presented. The author concludes that the report in published form is premature and that it presents the problem in an oversimplified form. Various investigative approaches (laboratory, social, epidemiological) are suggested.

- 65-2208 CIRCUMCISION AND CARCINOMA COLLI UTERI IN MACEDONIA, YUGOSLAVIA. RESULTS FROM A FIELD STUDY. I. INCIDENCE OF MALIGNANT AND PREMALIGNANT CONDITIONS. (E.) Kmet, J. (Inst. Oncol., Ljubljana, Yugoslavia), L. Damjanovski, M. Stucin, S. Bonta and A. Cakmakov. Brit. J. Cancer 17(3):391-399, 1963.

At the University Hospitals in Skopje, Macedonia (1956-1960) a lower incidence of cervix cancer was found in Moslem (M; 3364) than in non-Moslem (NM; 24,898) women. Of 3,633 women (1,078 M, 2,555 NM) seen during May and June 1961 in the district of Tetovo, the incidence of premalignant and malignant conditions was 2.7/1,000 in M women and 11.0/1,000 in NM women. In about 50% of M women of a very orthodox religious group

no precancerous or malignant pathologic findings were found. Among M males only 0.6% appeared to be not circumcised and 3.6% had a type of prepuce in which there was a slight possibility of smegma formation. Among NM males 72.6% had types of prepuces with definite possibility of smegma formation while only 8.4% had a type in which there was no possibility of smegma formation.

- 65-2209 CANCER EPIDEMIOLOGY IN WHO. (E.) Tuyns, A. J. (WHO, Geneva, Switzerland). Acta Un. Int. Cancr. 19:844-845, 1963.

In a discussion on the responsibilities of WHO in epidemiological research of cancer, the author mentioned that P. Stocks has found in a pilot study undertaken in Dublin and Belfast that smok can be considered to be responsible for a large proportion of lung cancers; however, other factors present in the atmosphere are also involved. A second epidemiological study showed that lung cancer mortality was higher in Finland than in Norway; this difference appears to be real and not due to casual differences in reporting cases

- 65-2210 THE VALUE OF CANCER RECORDS. (E.)
Walker, R. M. (Dept. Surg., U. Bristol England). Acta Un. Int. Cancr. 19:875-876, 1963

A record of cancer pts. in the South West Region of the United Kingdom from 1945 (about 10,000 new cases are recorded each yr.) showed that there have not been any marked changes in the incidence of any form of cancer except that of the lung. With reference to lung cancer, the number rose from 229 in 1948 to 1272 in 1959; registered cases rose from 8.6% to 12.7% since 1953.

- 65-2211 THYROID CARCINOMA IN UGANDA. (E.)
Shepherd, J. J. (Makerere U. Coll. Sch. Med., Kampala, Uganda) and I. A. Manthy. E. Afr. Med. J. 40(9):445-447, 1963.

In the Mulago Hospital, Kampala, during 1953-1962 25 pts. were admitted with thyroid carcinoma (22 confirmed histologically). Although 12/25 pts. were Baganda, there was no particular tribal or geographical pattern noted.

- 65-2212 BREAST CANCER IN AFRICAN WOMEN IN UGANDA. (E.) Shepherd, J. J. (Makerere U. Coll. Sch. Med., Kampala, Uganda). E. Afr. Med. J. 41(10):467-470, 1964.

In the largest hospital in Uganda (with 15,000 African admissions/yr.), only 104 pts. with mammary malignancies were admitted within a 10-yr period (1953-1962). It seems that the incidence of mammary neoplasms in Uganda Africans decrease after the menopause, except for a final peak in very advanced age.

65-2213 PRIMARY CARCINOMA OF THE LIVER. A STUDY OF 25 CASES PROVED AT POSTMORTEM EXAMINATION. (E.) Sudarsanam, D. (Christian Coll. Med. Hosp., Vellore, India), P. Kutumbiah, I. Samuel and E. W. Gault. Indian J. Path. Bact. 6:8-18, 1963.

Twenty-five cases (age 23-72 yr.; 22 male; 3 female, 1/3 age 1.5 yr.) of primary liver carcinoma were observed among 3,400 postmortem examinations performed at the hospital between 1945-61. The autopsy incidence was 0.74%, while the postmortem frequency among other malignancies was 7.1%. The peak incidence was between 21-50 yr. The nodular type of lesion was more common than the massive or diffuse type. Types were: hepatocellular 22, cholangiocellular 2, hepatocholangiocellular 1. All cases but 2 showed associated cirrhosis of varying types and degrees.

65-2214 RECENT ASSESSMENTS IN THE AETIOLOGY AND THERAPY OF SKIN CARCINOMAS. (E.) Belisario, J. C. (Royal Prince Alfred Hosp., Sydney, Australia). Indian J. Derm. Vener. 29:191-212, 1963.

See CRA 3(3):#638, 1965. (See also CRA 1(7):#1398, 1963.)

65-2215 A STATISTICAL PROBLEM IN SPACE AND TIME: DO LEUKEMIA CASES COME IN CLUSTERS? (E.) Ederer, F. (Biometrics Res. Br., Nat. Heart Inst., Bethesda), M. H. Myers and Mantel. Biometrics 20(3):626-637, 1964.

In a study on leukemia clusters conducted from 1945-59, 333 children (under 15 yr. of age) with leukemia who were residents of 169 towns in Connecticut were analyzed statistically. Using chi-square procedures, no 1- or 2-yr. clusters in the Connecticut data were detected. Although a childhood leukemia increase due to the increase in the number of children was seen, the leukemia incidence rate has remained stable.

65-2216 CHILDHOOD LEUKEMIA AND CANCER IN MEMPHIS AND SHELBY COUNTY, TENNESSEE: AN EPIDEMIOLOGIC STUDY. (E.) Hernandez, K. (St. Jude Res. Hosp., Memphis, Tenn.) and G. Tokuhata. Southern Med. J. 57(12):1477-1478, 1964.

In a study on childhood leukemia and cancer occurring in Memphis and its surrounding county area of Tennessee from birth through 19 yr. of age reported during 1939-1962, 114 cases of leukemia-lymphosarcoma were found with an incidence (per 100,000) of 34 in the white and 23 in the nonwhite population. More cases occurred in males and in the urban area (35 as compared to 19 for rural), while no significant racial difference was noted in the distribution of leukemia cell types. In the upper economic group

during the last 12 yr., the incidence of leukemia in children under age 5 yr. significantly increased while it decreased in children age 15-19 yr.; the former was due to the white male children. Solid tumors occurred in 286 cases with a rate of 56 for the white and 102 for the nonwhite population. Of these cases, primary intracranial malignancies (excluding retinoblastoma) comprised 25%, Wilms' tumor 10.5% and neuroblastoma 9%. No significant differences were seen in distribution according to sex, economic grouping or urban against county population.

65-2217 LEUKEMIA IN CHILDREN. INCIDENCE, CLINICAL MANIFESTATIONS, AND SURVIVAL IN AN UNSELECTED SERIES. (E.) Meighan, S. S. (1015 NW 22nd Ave., Portland, Ore.). J.A.M.A. 190(7):578-582, 1964.

Information was collected about 258 children (all less than 15 yr.; 145 boys, 113 girls) who died from leukemia (acute lymphocytic 225, granulocytic 13, monocytic 13, unspecified 4; and chronic granulocytic 3) in the State of Oregon during 1950-1961. The mean annual incidence was 4.53/100,000 as compared with the U.S. rate (1962 Dept. Vital Statistics) of 3.6/100,000. A peak incidence occurred at 3 yr. of age. Comparison of the expected incidence by each county with the observed incidence suggests that the disease is distributed spatially in a random manner. (See also CRA 1(4):#748, 1963.)

65-2218 STATISTICAL OBSERVATIONS ON BLADDER TUMOR. (Jap.) Yamazaki, K. (Dept. Derm. Urol., Fukushima Coll. Med., Japan) and T. Watanabe. Fukushima Igaku Zasshi (Fukushima Med. J.) 13(1-2):23-30, 1963.

Among 5,001 pts. seen in the Department of Urology (1951-1962) there were a total of 57 cases (1.14%) of urinary bladder tumors (transitional epithelial cell, squamous cell, and undifferentiated carcinoma). In no case was there a history of contact with benzidine or naphthylamine. In 9 cases there was a history of carcinoma in another member of the family, usually on the paternal side. In 8 cases, there was a history of previous gonococcal infection.

65-2219 SURVEY OF LEUKAEMIA IN THE WEST CORNWALL CLINICAL AREA (1948-1961). (E.) Wood, E. E. (West Cornwall Hosp., Penzance, England). Path. Microbiol. (Basel) 27(5):736-738, 1964.

Leukemia incidence in the various districts of the West Cornwall clinical area in 1948-61 ranged yearly from 2.3 to 24.8/100,000 of population. In a study of 251 individual cases, no correlation was demonstrated between the incidence of leukemia and various levels of radioactivity in different geographic locations or in drinking water.

- 65-2220 LEUKEMIA IN ICELAND 1957 TO 1961. (E.) Magnusson, S. (Dept. Hemat., University Hosp., Reykjavik, Iceland). Path. Microbiol. (Basel) 27(5):705-707, 1964.

Of 5,979 deaths occurring in 1957-1961 in Iceland, 1,265 were caused by cancer (including 9 cases of sarcoma). Leukemia caused 57 deaths (1% of total deaths, 4.3% of deaths from all malignancies). The yearly death rate from leukemia was 6.7/100,000; acute, chronic myelogenous, and chronic lymphatic forms accounted for 64.9%, 12.3%, and 22.8%, resp., of the leukemia deaths. The male:female sex ratio was 2.56:1; this was not statistically significant. At least 5 of the pts. were known to have been exposed to excessive radiation.

- 65-2221 STATISTICAL INVESTIGATIONS OF LEUKAEMIA IN JAPAN FROM 1956 TO 1961. (E.) Wakisaka, G. (Dept. Intern. Med., Kyoto U. Sch. Med., Japan), H. Uchino, K. Yasunaga, T. Nakamura, M. Sakurai, K. Miyamoto, T. Yoshino and M. Moriga. Path. Microbiol. (Basel) 27(5): 671-683, 1964.

See CRA 2(7):#1374, 1964. (See also CRA 1(11): #2006, 1964.)

- 65-2222 MORBIDITY AND MORTALITY FROM MALIGNANT NEOPLASMS IN THE USSR. Dean, J. G. (Ed.). (Merkova, A. M., G. F. Tserkovnogo and B. D. Kaufman, Russian Eds.). Pitman Med. Publ. Co., Ltd., London, 1963, 37 pp.

Extensive tabulations are presented on: the breakdown of urban, regional, and whole population mortality from malignancies by sex, age, organs affected, and for various calendar years in the USSR; current cancer as well as pre-cancer cases recorded by various oncological establishments in the USSR; results of widespread prophylactic examinations in the USSR; comparative age and sex breakdown of mortality from malignancies in USSR and 18 other countries. Much of the real increase in cancer mortality is due to the increased frequency of malignant tumors of the respiratory organs.

- 65-2223 SOME OBSERVATIONS ON RETINOBLASTOMA. (E.) Das, S. P. (Eye Infir., Med. Coll. Hosp., Calcutta, India). J. All India Ophthal. Assn. 12(3):128-131, 1964.

Among 590 cases of eye tumors seen over 11 yr. (1950-60), 140 (77 males, 63 females; age 3 wk.-20 yr., av. 3.5 yr.) were retinoblastomas (23.75%). Among the latter, 4 instances of familial incidence were observed; an association with trauma was seen in 7 cases. Spontaneous retrogression was noted in 3 cases.

- 65-2224 CONTRIBUTION TO THE STUDY ON THE EFFECT OF ATMOSPHERIC POLLUTION WITH CARCINOGENIC SUBSTANCES UPON THE INCIDENCE OF BRONCHOGENIC CARCINOMA. (Cz.) Krásná, V. (12 Rytířská, Prague 1, Czech.). Cesk. Hyg. 8:320-327, 1963.

Yearly mortality and morbidity due to bronchogenic carcinoma (BC) in various districts of the CSSR and for the entire CSSR are tabulated for 1956-1961; while mortality was greatest in the city of Prague morbidity fluctuated widely. No correlation between air pollution (with 3,4-benzpyrene and other polycyclic hydrocarbons and arsenic) nor between density of population in various districts of Prague and the incidence of BC could be established. Among 540 pts. with BC from 4 hospitals (including only 22 females), 243 were light smokers (smoked less than 20 cigarettes/day), 247 were heavy smokers, and 50 were nonsmokers. The employees of the railroad and city transportation system comprised more than 33% of the BC pts. (See also CRA 3(7):#1838, 1965.)

- 65-2225 EXPERIENCES ASSEMBLED HITHERTO WITH MANAGEMENT AND SCREENING OF PRECANCEROUS CONDITIONS IN THE NORTH MORAVIAN REGION. (Cz.) Brückner, L. (Dept. Oncol., State Hosp., Paskov, Czech.), J. Cron, L. Fajmanová and J. Rubáčková. Cesk. Zdrav. 11(12):508-513, 1963.

In the North Moravian region, among 129,488 oncologic examinations (8.8% of the population), 11,406 precanceroses (P; 8.8% of those examined) and 77 carcinomas (C) were found in 1960; in 1961 among 234,832 examinations (14.4% of the population), 15,958 P (6.8% of those examined) and 75 C were found; in 1962, among 374,466 examinations (22.9% of the population), 18,528 P (4.94% of those examined) and 186 C were found. The number of precancerous cases is tabulated by site and year.

- 65-2226 GEOGRAPHIC STUDIES ON CANCER. COMPARISON OF STANDARDIZED MORTALITY. (Ger.) Segi, M. (Dept. Public Health, Tohoku U. Acad. Med., Sendai, Japan) and M. Kurihara. Mitt Ges. Bekampf. Krebs. (Nordrhein-Westf.) 3(1): 69-159, 1963.

A detailed compilation of standardized cancer mortality rates of various countries in 1950-1959 is presented. Marked fluctuations from country to country were observed. In 1958-1959, gastric cancer mortality was very high in Japan (J), Finland (FL), Austria (A), and West Germany (WG), and low in the white and colored population of the USA; esophageal cancer was high in men of France (FR) and Switzerland (S), and women in FL; intestinal cancer was high in Scotland (Sc) and Canada (C), and low in J and FL; rectal cancer was high in Denmark (D) and low in Portugal (P) and Israel (I); hepatic and bile duct cancer was high in men of J, women of WG, and low in England (E), Wales (W), and Norway (N); pancreatic cancer

was high in the colored population of the USA, low in J and Italy (It); laryngeal cancer was high in men of FL; pulmonary cancer was high in Sc, E, and W, low in J and P; mammary cancer was high in D, Netherlands, E, and W, low in J; uterine cancer was high in the colored population of the USA, low in I; ovarian cancer was high in D and Sweden (Sw), low in J; prostatic cancer was high in the colored population of the USA, low in J; urinary bladder cancer was high in men of the South African Union (SAU), women in the colored population of USA, in E, W, and Sc, low in J; skin cancer was high in Australia, in SAU, in New Zealand, and in Ireland, low in J and the colored population of the USA; thyroid cancer was high in S and A, low in J; leukemia and aleukemia was high in the white population of the USA and in D, low in J. In general, mortality rates due to pulmonary cancer have been increasing in many countries, those of uterine cancer have decreased. In Japan, mortality due to prostatic, pulmonary, and pancreatic cancer has been increasing; that due to intestinal and mammary cancer, however, has remained low. Possibly, the demonstrated differences have a temporal rather than a geographic basis.

65-2227 MALIGNANT TUMORS OF THE FEMALE GENITAL ORGANS IN SENIUM. (Ser.) Drača, P. (Dept. Obstet. Gynec., Region. Gen. Hosp., Novi Sad, Yugoslavia). *Med. Pregl. (Novi Sad)* 16(7):411-414, 1963.

During a 10-year period (1950-59) in the Regional General Hospital in Novi Sad, 52/752 (6.8%) of pts. with malignant neoplasms of the female genital organs were aged 70 or more yr. All were carcinomas, except for one ovarian sarcoma. Number of malignant cases in old age (compared to the total) was: vulvar 9/23, vaginal 1/4, uterine cervix 35/581, uterine body 4/89, ovarian 3/54.

65-2228 MALIGNANT TUMORS OF THE GENITAL TRACT IN THE GYNECOLOGICAL DEPARTMENT OF THE REGIONAL GENERAL HOSPITAL IN NOVI SAD FROM 1957-1961. (Ser.) Prudan, R. (Dept. Obstet. Gynec., Region. Gen. Hosp., Novi Sad, Yugoslavia), S. Bolesnikov and O. Kuzmančev. *Med. Pregl. (Novi Sad)* 16(10):591-595, 1963.

In the Gynecological Department of the hospital 576 pts. (3.6% of all gynecological cases) with malignant neoplasms of the genital tract and 135 precancerous cases were found during the period 1957-61. Frequency of carcinomas by site was: uterine cervix 68.75%, uterus 13.36%, ovary 11.28%, fallopian tubes 0.52%, vagina 1.90%, vulva 2.43%. There were 0.69% sarcomas and 1.04% chorionepitheliomas. Uterine and ovarian neoplasms are most frequent in the older age groups; cervical malignancies appeared in the third decade.

65-2229 SEASONAL VARIATIONS IN THE INCIDENCE OF THE CLINICAL ONSET OF LEUKAEMIA.

(E.) Lee, J. A. H. (Med. Res. Council, London Hosp., E.1). *Path. Microbiol. (Basel)* 27(5):772-776, 1964.

See CRA 1(9-10):#1782, 1964.

65-2230 LEUKEMIAS IN POLAND. (E.) Janicki, K. (3rd Dept. Intern. Dis., Acad. Med., Cracow, Poland). *Acta Med. Pol.* 5(5):267-281, 1964.

See CRA 2(3):#548; and *ibid.*, (7):#1379, 1964.

65-2231 CANCER IN ASSAM. OBSERVATIONS BASED ON A STUDY OF 2,493 BIOPSY SPECIMENS OF MALIGNANT TUMORS. (E.) Baruah, B. D. (Dept. Path., Assam Coll. Med., Dibrugarh, India). *Cancer* 17(4):413-431, 1964.

The frequency of cancer in Assam, the easternmost state of India (population 8,096,216) based on 2493 malignant tumors (2393 carcinomas, 100 sarcomas) diagnosed from 23,405 biopsy tissues during 1949-1960 was as follows for the carcinomas and all the tumors: 754 hypopharynx and larynx (includes piriform fossa (664 cases), epilarynx, vocal cord), 31.5% and 30.22%; 245 esophagus, 10.2% and 9.8%; 176 oral cavity (includes anterior two-thirds of tongue, cheek, gum, lip, hard palate), 7.3% and 7.0%; 488 oropharynx (includes base of tongue (140 cases), tonsil (208), pharynx (106) and soft palate (34)), 20.3% and 19.5%; 142 cervix, 5.8% and 5.6%; 119 skin, 4.9% and 4.8%; 83 penis, 3.4% and 3.3%; 64 breast, 2.6% and 2.5%; 46 stomach, 1.9% and 1.8%; 35 rectum, 1.46% and 1.40%; 15 nasopharynx, 0.62% and 0.6%; 8 bladder, 0.33% and 0.32%; 6 lung, 0.25% and 0.24%; 212 other organs (liver, intestine, testes, thyroid, ovary, etc.), 8.8% and 8.5%, resp. Carcinoma of the upper alimentary tract constituted 59.1% of all carcinomas and 56.7% of all malignant tumors. The peak frequency of carcinoma of the oral cavity, oropharynx and hypopharynx and larynx was found in pts. between 41 and 50 yr. of age. It was more common among Hindus than among Moslems and was found to be a predominantly male disease.

65-2232 AETIOLOGY AND EPIDEMIOLOGY OF ORAL CAVITY CANCERS. (E.) Sidiq, Y. (Gov. Gen. Hosp., Madras, India), K. R. Rajagopalan and M. S. Krishnamurthy. *J. Indian Med. Assn.* 43(11):526-529, 1964.

Of 13,626 cancers of all sites seen during 1950-1959, 6728 (50%) were of the oral cavity and the distribution by site was as follows: buccal mucosa, 4230; anterior tongue, 864; posterior tongue, 416; alveolus, 407; hard and soft palates, 351; lip, 330; and not classifiable, 130. The male to female sex ratio was 8:3. The peak age incidence was 40-60 yr. (60% of cases). Nearly 95% of the males and 96% of the females were chronic betel-nut chewers (with or without tobacco) for 10-20 yr. In this series, 95% of

the pts. belonged to a very low income group and were in poor general condition. Geographically, nearly 30.3% of the out-pts. came from the State of Kerala, about 500 miles away.

65-2233 DOUBLE TUMORS IN THE NETHERLANDS.

(Dut.) De Kloe, W. (Cent. Cancer Registry, Amsterdam, The Netherlands) and L. Meinsma. Nederl. T. Geneesk. 107:1630-1638, 1963.

Data derived from the Central Cancer Registry of the Netherlands for the yr. 1960 indicated that only 2.2% of 12,893 cancer pts. developed a second malignancy. The interval between the first and second tumors averaged 2.8 yr. (in men, 2.5 yr. (1-16); in women 3.1 yr. (1-21)). In a more detailed study of 2083 pts., the incidence of a second malignancy was 2.5%. There was no significant difference as to sex in either series. The probability of the occurrence of double tumors increased with age. Also reported are detailed data concerning tumor sites, both for pts. with a second malignancy and for the study group as a whole. In the light of a statistical analysis of the data presented, it is concluded that pts. with a first malignant tumor are probably less likely to develop another malignant process.

65-2234 CANCER MORTALITY IN NORTH RHINE WEST-PHALIA 1949-1951 ACCORDING TO DISTRICTS.

(Ger.) Freudenberg, K. (Sem. Statist. Med., Free U. Berlin). Mitt. Ges. Bekampf. Krebs. (Nordrhein-Westf.) 3(1):1-68, 1963.

Mortality tables for various cancers by site and according to age and sex in 94 districts of North Rhine Westphalia in 1949-51 are presented. Correlation coefficients for occupations, population density, age and sex are listed for various cancer sites.

65-2235 CANCER IN IRAN. A SURVEY OF THE MOST COMMON CASES. (E.) Habibi, A.

(Tehran U., Iran). J. Nat. Cancer Inst. 34(5): 553-569, 1965.

Statistics on cancer in Iran were collected from the Pathology Department of the Medical School, the Pathological Laboratory of the Cancer Institute of Tehran, and from pts. referred by private physicians to private laboratories. Complete information is not available because a cancer control program and methods for collection of accurate information are just being developed. From 10,000 cancer cases it was determined that the most frequent types were: cancer of the skin (21.6%), cancer of the cervix uteri (9.9%), primary cancer of the lymphatic organs (8.5%), cancer of the breast (6.3%), and cancer of the respiratory tract (7.5%). Various conditions that may promote the development of cancer, such as exposure to sun, contamination of air, background, hygiene, and frequency of childbirth are discussed.

65-2236 STATISTICAL DATA ON BRONCHIAL CANCER AMONG IRON MINERS IN THE LORRAINE BASIN

(Fr.) Roussel, J. (Anticancer Ctr. Lorraine, Nancy, France), C. Pernot, P. Schoumacher, M. Pernot and Y. Kessler. J. Radiol. Electr. 45(10):541-546, 1964.

After reviewing the literature (9 references) on bronchial cancer among iron miners, statistical data are reported on 225 cases from the Lorraine basin in France. Histologic classification was possible in 194 cases, of which 85 (43.8%) were anaplastic; 102 (48/102 differentiated, 29/102 slightly differentiated, 25/102 not classified), or 52.6%, were epidermoid; 7 (3.6%) were adenocarcinomas. The ratio of epidermoid to anaplastic bronchial cancers among miners was 1.2:1; and among non-miners it was 2.3:1. The most frequent sites among miners were the right inferior (18.3%) and right superior lobes (17.64%), as compared to the right (21.9%) and left superior lobes (17.08%) among non-miners. Among miners, the age at the time of diagnosis ranged from 31-81 yr. (200/223 cases between ages 45-70); among non-miners, the av. age was 57.5 yr. The smoking habits of the miners did not differ strikingly from those of the non-miners. Morbidity rates were determined as ratio between the percentage of cancers observed in a given occupational group at the Anticancer Center of Lorraine and the percentage which this group represents among the active male population of Meurthe-et-Moselle, Meuse and Vosges. The highest rates were seen for workers involved in industrial extraction (3.47) to which iron miners belong, for workers involved in land transport (1.94) and for polygraphic workers (1.44).

65-2237 MORTALITY OF COAL-MINERS FROM CARCINOMA OF THE LUNG. (E.) Goldman, K. P.

(Brompton Hosp., London, S.W.3). Brit. J. Indus. Med. 22(1):72-77, 1965.

In data reported by the Registrar General, the standardized mortality ratio (SMR) for lung cancer for men aged 20-65 in mining and quarrying occupations in coal fields in England and Wales was 71 for the period 1949-53. Similar figures were recorded for 1955 by the National Coal Board but a higher lung cancer mortality was reported by Reid in surface workers (SMR 91.5) as compared to underground workers (SMR 70.1). A relatively higher SMR from lung cancer was seen in the north northwest, northeast and southwest divisions as compared to the rest. In a survey conducted in the Welsh mining community of Rhondda Fach for the period 1951-56 among 5,096 miners aged 35 yr and over, the SMR was 81.1; further analysis according to radiographic category of pneumoconiosis (PC) showed the lowest mortality from lung cancer in miners with simple PC (57.1), an intermediate rate in those with no evidence of PC (86) and the highest rate (99.9) among men with progressive massive fibrosis. In 11 Welsh towns during 1956-61, death rates were lower in towns situated in mining areas than those in non-mining

areas. The low lung cancer rate among miners showed no relationship to cigarette consumption or atmospheric pollution. It is suggested that a reduced lung cancer risk is a specific effect of working in a coal mine and that an occupational factor such as the inhalation of coal dust antagonizes the induction of pulmonary malignant change.

65-2238 CORRELATIONS BETWEEN NEOPLASMS AND ABO BLOOD GROUPS. (It.) Spena, A. (Riuniti Hosp., Naples, Italy) and A. Grippo. Rass. Int. Clin. Ter. 44(19):1064-1077, 1964.

In a survey of the blood groups of 1,025 cancer pts. from the Campania region of Italy, the frequency, percentage and difference as compared to 2,147 controls was: Group O--417, 40.60 and -5.93; Group A--472, 46.00 and +6.55; Group B--89, 8.6 and -1.27; Group AB--47, 4.58 and +0.44. No significant correlation was apparent with regard to sex. According to site, an excess of blood Group A was seen for cancer of the stomach (89/156 or 57.05%), prostate (34/93 or 36.55%), uterus and ovary (95/191 or 49.73%) and colon and rectum (46/102 or 45.09%) with a difference with respect to controls of +17.60, +11.76, +10.28 and +5.64, resp. There was a parallel decrease in the incidence of blood Group O.

65-2239 LEUKAEMIA IN NEW ZEALAND AND AUSTRALIA. (E.) Gunz, F. W. (Dept. Path., Christchurch Hosp., New Zealand). Path. Microbiol. (Basel) 27(5):697-704, 1964.

The overall incidence of leukemia in Australasia is about 6/100,000, with 20% of the cases occurring before age 15, 20% between 15 and 50, and 60% after age 50. Approx. 60% of all cases are acute (AL), 25% chronic lymphocytic (CLL), and 15% chronic granulocytic (CGL). CLL is usually limited to late middle age and old age; CGL occurs at all ages; AL is the commonest type at all ages and constitutes the majority of childhood cases. Factors of possible etiologic significance include familial factors in 10 pts., mongolism or mongoloidism in 5, and therapeutic irradiation in 11. Past or concurrent cancer was found in 10 pts. with AL, 4 with CGL, and 27 with CLL (the latter concurrence being highly significant as compared to controls).

65-2240 MORBIDITY AND SURVIVAL RATES FOR CANCERS OF THE HEMATOPOIETIC SYSTEM IN BELGIUM. (E.) Méwissen, D. J. (Belgian Cancer Soc., Brussels) and E. H. Betz. Path. Microbiol. (Basel) 27(5):739-745, 1964.

During 1957-1961, in a population of about 6,000,000, there were registered 73 cases of reticuloendotheliosis (RE), 114 reticulosarcomas (RS; 70 male (M), 44 female (F)), 364 lymphosarcomas (LS; 233 M, 131 F), 122 myelomas (MY;

65 M, 57 F), 201 acute leukemias (AL; 119 M, 82 F), 295 lymphoid leukemias (LL; 188 M, 107 F), and 288 myeloid leukemias (ML; 171 M, 117 F). The age distribution was similar for RE, RS, LS, and MY, with susceptibility increasing to a peak between yr. 60-75, then decreasing sharply. The incidence of LL decreases to a minimum during early adult life, then increases sharply (at age 50-60 yr.), whereas ML exhibits more of a steady increase. Both reach a peak at age 65-75 yr., then decrease sharply. AL has a relatively high incidence in the early period of life, then decreases, and rises again though not as steeply as LL and ML.

65-2241 LEUKAEMIA IN BRITAIN AND SCANDINAVIA. (E.) Court Brown, W. M. (Med. Res. Council, Western Gen. Hosp., Edinburgh, Scotland), R. Doll and I. D. Hill. Path. Microbiol. (Basel) 27(5):644-654, 1964.

Leukemia mortality rates (per 1,000,000) in England and Wales for the period 1958-61 was as follows for men and women: chronic lymphatic, 12.6 and 8.6; chronic myeloid, 9.4 and 10.5; acute lymphatic, 13.9 and 9.8; acute myeloid, 25.9 and 21.2. Mortality due to all types of leukemia increased between 1945-49 and 1958-61 by 56%. Mortality from leukemia (per 1,000,000) standardized for age was 53.9 in England and Wales, 60.6 in Finland, 68.8 in Norway, 72.0 in Sweden, 74.2 in Iceland, and 80.4 in Denmark. The Danish mortality was relatively high in old age and in childhood, Swedish mortality was particularly high in childhood, whereas mortality in Norway and Britain was fairly evenly distributed over all ages.

65-2242 INCIDENCE AND DISTRIBUTION OF THE CASES OF LEUKEMIA IN THE YEARS 1959-1961 IN THE PROVINCE OF MILAN. (E.) Eridani, S. (Clin. Med., U. Milan, Italy) and R. Tiso. Path. Microbiol. (Basel) 27(5):746-752, 1964.

Among 408 pts. with leukemia (L) hospitalized in 1959-61 in the Province of Milan, 164 had acute L, 102 chronic myeloid L. Among 94 cases of chronic lymphocytic L there was a slight excess of males. As regards age incidence for the whole group, there was a peak in childhood (mainly attributable to acute L), and a second, larger peak in middle age (due to chronic lymphocytic L and chronic myeloid L). Significant variations in the geographical distribution of L in the Province were found but no relationship to various occupations was established.

65-2243 TUMOURS OF THE TESTIS IN SOUTH AFRICA. (E.) Oettle, A. G. (S. Afr. Inst. Med. Res., Johannesburg). Leech 34(5):142-148, 1964.

Mortality (per 100,000 per yr.) from testicular tumors in Asians (predominantly Indians) was 0.1, whereas in white or colored it was 0.6. In Bantus, the rate was 0.4 and these tumors accounted for

0.4% of all male cancers. Within the age group 15-44, the most common tumor types were embryonal carcinomas, teratomas, choriocarcinomas, and seminomas. Etiology (including imperfect testicular descent, trauma, mumps orchitis, hormonal factors, genetics, social class, marital status, the side affected and local temperature) was discussed but no obvious common cause for germinal tumors has been defined.

- 65-2244 MORTALITY OF GASWORKERS WITH SPECIAL REFERENCE TO CANCERS OF THE LUNG AND BLADDER, CHRONIC BRONCHITIS, AND PNEUMOCONIOSIS. (E.) Doll, R. (University Coll. Hosp. Sch. Med., London), R. E. W. Fisher, E. J. Gammon, W. Gunn, G. O. Hughes, F. H. Tyrer and W. Wilson. Brit. J. Indust. Med. 22(1):1-12, 1965.

Mortality of selected groups of gasworkers was observed over a period of 8 yr. The death rate due to lung cancer for workers with heavy exposure to products of coal carbonization was 3.06/1,000, which was 69% higher than workers with no such exposure. Standardized annual death rates (per 1000 men) for cancer of the bladder, or skin and scrotum, and other unspecified cancers were as follows for the various classes: heavy exposure, 0.31, 0.07 and 1.96; intermittent exposure, 0.20, 0 and 2.2; no exposure, 0.08, 0 and 2.09, resp. No significant variations in smoking habits were found. Lung cancer mortality was highest among men who worked in horizontal retort houses. Retort house workers also had a slightly increased mortality from cancer of the bladder. Cancer of the scrotum was probably also occupationally induced in 3 isolated instances.

- 65-2245 UTERINE CARCINOMA IN THE TERRITORY OF SR MACEDONIA. (Maced.) Čakmakov, A. (Dept. Obstet. Gynec., U. Skoplje Sch. Med., Yugoslavia), M. Stankovski, L. Šukarov, L. Grozdev and A. Zafirov. Makedon. Med. Pregl. 18(3-4): 118-126, 1963.

In Macedonia, Yugoslavia, 626 cases of uterine carcinoma (UC) were registered during the last decade: cervix (CC), 539 pts. (86.2%); uterine body (UBC), 87 pts. (13.8%). Incidence of CC in Macedonia was 5.5/100,000 women; there were approx. 54 new cases/yr. Av. age of CC pts. was 50 yr.; av. age of UBC pts. was 60 yr. Of a total of 584 UC cases, 209 came from villages and 375 from cities. In 1961 the incidence of UC was 0.23/10,000 village population and 0.65/10,000 city population. Of 502 pts. with CC 42 (8.3%) were muslims and 460 (91.7%) non-muslims. Statistical data for 1953 and 1961 showed that the rate (per 10,000 population) of UC was 0.12 for muslim and 0.45 for non-muslims. Among UBC pts., 25.6% were multiparas.

- 65-2246 POTASSIUM AND CANCER. (Fr.) Guerrin, A. (Spec. Sch. Public Works, Paris). Rev. Path. Comp. 64(7):321-326, 1964.

In this paper, the third of a continuing series (see CRA 3(6):#1326 and #1414, 1965 and the following abstracts), the author analyzes cancer mortality in relation to the daily intake of potassium by the people in 21 different countries. He concludes that there is a direct relationship between the use of potassium and cancer incidence.

- 65-2247 POTASSIUM AND CANCER. (Fr.) Guerrin, A. (Spec. Sch. Public Works, Paris). Rev. Path. Comp. 64(8):385-396, 1964.

In this paper, the fourth of a continuing series (see the preceding and the following abstracts), the author concludes that the relationship observed between cancer mortality and potassium alimentation in 27 different countries has mathematical significance.

- 65-2248 POTASSIUM AND CANCER. (Fr.) Guerrin, A. (Spec. Sch. Public Works, Paris). Rev. Path. Comp. 64(9):457-478, 1964.

In this paper, the fifth of a continuing series (see the 2 preceding abstracts), the author examines the potassium-cancer relationship from the bioelectronic point of view and concludes that an excess of potassium in the human organism can lead to cancer. The potassium ion by itself is not dangerous but when chemically combined in its salt it may become carcinogenic by acting on the pH, the oxidation-reduction potential and the electrolyte conc. of the circulating fluids.

- 65-2249 CANCER OF THE BREAST. ETIOPATHOGENIC AND CLINICAL OBSERVATIONS ON 484 SURGICAL CASES. (It.) Vio, A. (Inst. Gen. Clin. Surg. U. Bologna, Italy), A. Platanà and C. De Rubertis. Clinica (Bologna) 24(2):97-106, 1964.

A clinical and statistical analysis of the records of 484 women with cancer of the breast who underwent mastectomy in the Surgical Department of the University of Bologna during the yr. 1939-57 revealed that the highest incidence was in the 41-60 yr. age group (55%). The incidence of familial cases was 4.54% (22/484). The majority (84.01%) were married and 74% had had children. No relationship was found between number of pregnancies and tumor but the number of interrupted lactations might be of some etiologic significance. Trauma was present in the history of 10.5% of the pts.; mastopathy in 1.8% and inflammatory conditions in 0.8%. Histologically, there were 288 (59.5%) solid carcinomas, 125 (25.9%) adenocarcinomas, 61 (12.6%) scirrhous and 10 (2%) papilliferous carcinomas.

See also abstract no.: 2097

MISCELLANEOUS

5-2250 MODIFIED A ANTIGEN IN MYELOBLASTIC LEUKEMIA. (Fr.) Berger, H. (Savoy Blood Transf. Ctr., Chambéry, France) and B. Noel. *Transfusion (Paris)* 7(3):301-302, 1964.

After the sudden appearance of anemia (<2,000,000 BC) in a 53-year-old man under treatment for myeloblastic leukemia with various anti-leukemic agents the pt. was found to be Rh positive and of blood group A, with weak agglutination by anti-A₁ and anti-H fractions. Partial agglutination was later noted, however, with both anti-A₁ (11% of cells) and anti-A (38% of cells). The pt.'s wife and daughter were both of blood group A; no data on his parents were available. It is suggested that a somatic mutation at the level of the cells of the RES of the bone marrow may be responsible for this blood group anomaly.

5-2251 COEXISTENCE OF CANCER AND SIMPLE ULCER OF THE STOMACH. (It.) Antonucci, G. (Inst. Santo Spirito, Riuniti Hosp., Rome) and L. Misiti. *Minerva Chir.* 19(23):838-842, 1964.

The frequency of association of duodenal ulcer and gastric ulcer with cancer of the stomach is reviewed (54 references) and the case history presented of a 65-year-old woman with concomitant gastric ulcer and neoplastic infiltration. Contrary to most current theories, the authors do not exclude the possibility that the neoplastic lesion may have occurred first.

5-2252 CARCINOMA FORMATION IN WERNER'S SYNDROME. (Ger.) Gertler, H. (Skin Clin., County Hosp., Potsdam, Germany). *Derm. Wschr.* 90(49):606-616, 1964.

Case report (cornified squamous cell carcinoma of the ankle, developing at the site of chronic ulceration).

5-2253 PULMONARY INFARCTION ASSOCIATED WITH LUNG CANCER. (E.) Berkheiser, S. W. (Dept. Lab., Harrisburg Polyclin. Hosp., Pa.). *Chest* 47(1):36-41, 1965.

Survey of 71 lung cancer cases from the files of surgical cases and 90 such cases from necropsy files yielded 6 cases (3.7%) of lung cancer associated with true pulmonary infarcts. The 6 case histories are presented in detail. It was concluded that there seems to be a significant correlation between pulmonary infarction and the origin of peripheral scar cancer of the lung.

5-2254 A HISTOCHEMICAL CONTRIBUTION TO THE QUESTION OF THE OXYPHILIC GRANULAR CELL CARCINOMA (MALIGNANT ONCOCYTOMA) IN X-IRRADIATED ETAGEN-TUBERCULOSE¹¹] (SCROFULODERMA + LUPUS

VULGARIS). (Ger.) Goslar, H. G. (Inst. Anat., U. Bonn, Germany), W. Schneider and W. Undeutsch. *Acta Histochem. (Jena)* 19(1-4):14-23, 1964.

A 70-year-old woman with history of fistulating lymph node tuberculosis since age 24 yr., and who had undergone numerous X-ray treatments within a period of 25 yr., developed a malignant oncocytoma. Various histochemical reactions are described in detail for various stages of cellular degeneration. In the course of catabiosis, the neutral polysaccharides and then the acid mucopolysaccharides accumulate, while the sulfhydryl activity decreases. The isoelectric point shifts towards the acid side. No increase in DNA nor RNA could be demonstrated.

65-2255 CROSS RESISTANCE OF TUMOR-RESISTANT RATS. (Ger.) Teichmann, B. (Robert-Rossle Clin., German Acad. Sci., Berlin). *Naturwissenschaften* 51(24):640-641, 1964.

Four groups of Wistar rats (8 each) received 3 diffusion chambers implanted i.p. The chambers contained tumor tissue combined 1:1 with spleen (S) or axillary lymph node (LN) tissues of tumor resistant rats. The latter had become resistant after repeated inoc. of virulent Walker carcinoma (WC) or Jensen sarcoma (JS) tissues. All 4 groups received S or LN tissue and, in addition, Group I received WC, Group II JS, Group III benzpyrene (BP)-induced tumor (rat), and Group IV methylcholanthrene (MC)-induced tumor (rat). Controls received only WC, JS, BP or MC, resp. Ten or 20 days after the implantation, the chambers were removed; the larger part was tested for virulence (by transplantation to untreated rats) and the rest was examined histologically. It could be shown, in recipient animals (compared to controls), by the number of identical tumors produced in this way, that S and LN tissue of WC-resistant rats could bring about death in the diffusion chamber not only to WC but also to JS tissue. During the interval observed, a similar but weak effect of S and LN on BP and MC tumor tissue was demonstrable during the 20 days of transplantation; this effect can probably be traced to an induced immunological defense on the part of the normal tissue to one of these tumors only after combination with the S and LN tissue. Corresponding results were obtained with S and LN tissues of JS-resistant rats.

65-2256 TUMOR TISSUE COMBINED WITH SPLEEN, LYMPH NODE OR THYMUS TISSUE OF THE RAT IN DIFFUSION CHAMBERS. (Ger.) Teichmann, B. (Robert Rossle Clin., German Acad. Sci., Berlin). *Experientia* 21(3):165-166, 1965.

Walker carcinoma tissue lost its virulence when grown for 7-30 days in a 1:1 ratio with spleen or lymph node tissue of 8-month-old Wistar rats in an i.p. diffusion chamber with pores of 300 mμ

implanted into Wistar rats. When grown with thymus tissue of the same donors or alone (controls), it did not lose its virulence as shown by ability to grow on transplantation. (See also CRA 2(3):#449 and #569; *ibid.*, (8):#1602, 1964 and the preceding abstract.)

- 65-2257 FLUORESCENT ANTIBODY STAINING OF EHRLICH ASCITES TUMOR CELLS. (Jap.)
Konn, M. (Dept. Surg., Hirosaki U. Sch. Med., Japan). *Hirosaki Igaku (Hirosaki Med. J.)* 15(4):746-754, 1963.

Homogenates of Ehrlich ascites tumor cells and of muscle tissue of dd mice were used as antigens to obtain corresponding antisera in rabbits. In a complement fixation test, the anti-tumor serum showed a high titer of antibody against the tumor antigen (1:256) but only a low (1:4) or undetectable titer against the muscle antigen, while the anti-muscle serum showed a high titer against the muscle antigen (1:64) but only an undetectable titer against the tumor antigen. By employing the fluorescent antibody technic, Ehrlich ascites tumor cells were stainable with the anti-tumor serum, the staining titer corresponding to the titer obtained from the *in vitro* complement fixation test. This anti-tumor serum also stained mouse Sarcoma 180 (ascites type), suggesting the presence of a common antigen between the Ehrlich tumor and Sarcoma 180. Mouse leukemia SN-36 ascites cells and ascites cells induced by inj. of nutrient medium failed to be stained by this anti-tumor serum.

- 65-2258 SPONTANEOUS MELANOMA IN REGENERATING TAILS OF AXOLOTLIS. (E.) Sheremetieva, E. A. (Roswell Park Mem. Inst., Buffalo, New York). *J. Exp. Zool.* 158(1):101-121, 1965.

Single or repeated amputations (total 21) through or near 8 spontaneous melanomas in the tails of dark-colored and albino axolotls (*Siredon mexicanum*) were carried out in order to study relationships between neoplasia and regeneration. Regeneration was almost always essentially normal in the presence of a spontaneous melanoma, even when the regenerate grew from the tumor itself or from a previous regenerate that is black with melanotic cells. It was shown that neoplastic processes can take place in the presence of regeneration but melanotic ingrowth into a regenerate is limited to temporary symbiotic participation. When regeneration is abnormal, melanotic cells may behave as they do in the absence of regeneration. There was no evidence that the neoplastic melanotic cells could be transformed back into normal pigment cells from which they are presumably derived. The melanization associated with spontaneous melanoma in the axolotl seemed completely separate from normal pigmentation.

- 65-2259 SOME CHARACTERISTICS OF NON-SPECIFIC IMMUNITY IN ACUTE LEUKEMIAS IN CHILDREN. (Rus.) Demin, V. F. (Dept. Pediat., N. I. Pirogov 2nd Med. Inst., Moscow). *Pediatrics* 44(1):52-56, 1965.

Properdin (P) and complement (C) levels which serve as indexes of non-specific immunity (= NI) were studied in 32 children (16 girls and 16 boys) with various acute leukemias. NI decreased at the climax of the disease, increased during improvement, remained at high levels during remission, significantly decreased during exacerbation and was almost undetectable during the terminal period. P and C titer indexes were lowest during periods of exacerbation.

- 65-2260 THE RADIOLOGIC PICTURE OF GASTRIC CANCER AFTER RESECTION OR GASTROENTEROANASTOMOSIS FOR PEPTIC ULCER. (It.) Bono, F. (Inst. Radiol., U. Bologna, Italy) and C. Rimondi. *Ann. Radiol. Diagn. (Bologna)* 37(4):330-351, 1964.

Described are 23 pts. (20 men and 3 women), age 42-84 yr., who developed gastric cancer 4-37 yr. (av. 17.3) following stomach resection (15/23) or gastroenteroanastomosis (8/23) for duodenal (20/23) or gastric (3/23) ulcer.

- 65-2261 GIANT CONDYLOMA AND VERRUCOUS CARCINOMA OF THE GENITAL AREA. (E.) Dawson, D. I. (VA Hosp., Memphis, Tenn.), J. K. Duckworth, H. Bernhardt and J. M. Young. *Arch. Path. (Chicago)* 79(3):225-231, 1965.

Four cases (3/4 Negro) of giant condyloma of the male genital area are presented, with eventual change to carcinoma in 3 cases. All 4 pts. had received podophyllin treatment.

- 65-2262 INCIDENCE OF SECOND PRIMARY TUMORS IN CHILDREN WITH CANCER AND LEUKEMIA. A SEVEN-YEAR SURVEY OF 150 CONSECUTIVE AUTOPSIED CASES. (E.) Regelson, W. (Roswell Park Mem. Inst., Buffalo, N. Y.), I. D. J. Bross, J. Hanania and G. Nigogosyan. *Cancer* 18(1):58-72, 1965.

Eight out of 150 autopsy cases of children had two primary tumors which differed as to site and histological type. In 5/8 both tumors were concurrent. Distribution of primary tumors and of multiple primaries is discussed.

- 65-2263 THE ASSOCIATION OF TUBERCULOSIS WITH PRIMARY LUNG CANCER. (It.) Lenci, G. (Sanatoriale Hosp., Padua, Italy), E. Alfieri and L. Pancotto. *Gior. Pneumol.* 8(5):576-583, 1964.

Presented are 5 male pts. who between 1958-62 developed primary lung cancer after tuberculosis. In the period 1937-63 in the Sanatoriale Hospital

of Padua 6/49 (12.2%) tuberculosis pts. developed lung cancer.

- 65-2264 TRAUMA AS A PATHOGENIC FACTOR IN MYXOCHONDROSARCOMA OF THE RIBS. (It.) Micieli, G. (Inst. Semeiotic Surg., U. Rome) and P. Pulsoni. Ann. Ital. Chir. 41(5-6):490-504, 1964.

Presented is the case of a 56-year-old man who developed a myxochondrosarcoma of the ribs at the site of a knife wound inflicted 5 yr. previously.

- 65-2265 CANCER AND PULMONARY TUBERCULOSIS. (Fr.) Schwartz, P. (Warren, Pa.) Arch. Med. Gen. Trop. 40:145-152, 1963.

After reviewing (no references) collected data on increased mortality from cancer of the respiratory tract, the author discusses the importance of chronic tubercular lesions and scarring in the development of lung cancer. The author describes 21 cases from personal observation of bronchial tumors (14 malignant, 7 benign) arising in scar areas after perforation of bronchial lymph nodes. Increased longevity is also mentioned as a contributing factor.

- 65-2266 CANCER AND SILICOSIS. (It.) Domenici, F. (Inst. Legal Med., U. Pisa, Italy). Rass. Clinicosci. 40(9):245-247, 1964.

Described is the case of a 44-year-old man affected by silicosis who developed an undifferentiated lung carcinoma.

- 65-2267 BILE ACIDS AND OTHER LIPIDS IN THE GALL-BLADDER BILES OF AFRICANS WITH PRIMARY CANCER OF THE LIVER. (E.) Mirvish, S. S. (Dept. Physiol., U. Witwatersrand, Johannesburg, S. Africa). Brit. J. Cancer 18(3):478-483, 1964.

In extracts of bile collected 4-24 hr. post-mortem from 26 cases (Africans in Mozambique), including 10 primary liver cancers (LC) and 2 urinary bladder cancers (UBC), the ratio of gluco- to tauro-acids was decreased in LC and UBC cases to one-third of the normal values; however, this is not specific as it was found also in some other conditions. The ratio (glycocholic + glycodeoxycholic acid)/glycochenodeoxycholic acid had some tendency to increase in LC as compared to controls, but was markedly less in both groups than in normal subjects. In most other respects, the composition of the bile from LC and control cases was similar.

- 65-2268 METASTASIS OF MAMMARY CANCER TO THE PLACENTA. (Pol.) Pisarski, T.

(Dept. Obstet. Gynec., Acad. Med., Poznan, Poland) and A. Mrożewski. Ginek. Pol. 35(2):277-286, 1964.

A 6-month-old male child born of a mother who presented with mammary carcinoma with placental, pulmonary and cerebral (probable) metastases during pregnancy showed signs of dystrophy and anemia, but was in a good general state. Only 16 similar cases are reported in the literature, of which 13/16 had metastases to the placenta and 4/16 to the fetus. In the case presented, the mother was Rh negative and the child Rh positive; this factor is mentioned in a discussion (15 references) of the low incidence of metastases generally found in the fetus.

- 65-2269 RELATION BETWEEN LUNG CANCER AND PNEUMOCONIOSIS OF CITY DWELLERS. (E. & Jap., Abstract) Ebato, T. (Path. Lab., Hiroo Tokyo Prefect. Hosp., Japan). Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:234-235, 1964.

In an autopsy study of 160 city residents (Tokyo), 11 had lung carcinoma. Out of these 11 cases, 7 were complicated by pneumoconiosis, and 5 by tuberculosis. These changes originated in sites adjacent to the pneumoconiotic and silicotuberculo-cotic foci. Smoking was not related to lung cancer in this survey. Occupational exposure was not included.

- 65-2270 PSEUDOPOLYPOSIS AND CARCINOMA OF THE COLON. (It.) De Vita, U. (Inst. Spec. Path. Surg., U. Milan, Italy). Arch. Ital. Chir. 90(3):334-335, 1964.

Of 12 cases with pseudopolyposis localized to the colon, two had concomitant carcinoma.

- 65-2271 LYMPHANGIOSARCOMA FOLLOWING MASTECTOMY. (Sp.) Martorell, F. Actas Cuerpo Fac. Inst. Policlin. (Barc.) 18(5):81-85, 1964.

A 56-year-old woman developed a lymphangiosarcoma of the left arm 16 yr. after a left mastectomy for cancer of the breast. A few days after mastectomy the pt. had developed a lymphedema of the arm which persisted throughout the 16 yr. without modification.

- 65-2272 MICROKINEMATOGRAPHIC STUDY OF THE MECHANISM OF MALIGNANT INVASION IN ASSOCIATED CULTURES OF NORMAL AND MALIGNANT CELLS. (Fr.) Barski, G. (Gustave Roussy Inst., Villejuif/Seine, France) and J. Belehradek, Jr. Exp. Cell Res. 37(2):464-480, 1965.

The growth of mixed cultures of C3H normal mouse embryo heart tissue and the highly malignant strain

N1 of typical fibroblastic aspect or the hybrid clone M6, similarly malignant but of different morphology, was studied by phase contrast time-lapse cinematography. While normal cells were characterized by moderate activity of ectoplasmic membranes and good mutual cohesion, malignant N1 and M6 cells showed a very marked and abrupt activity of ectoplasmic membranes and pseudopodia and formed a disordered, intermingled pattern with little cohesion and single ("sentinel") cells frequently detaching from the colony. Malignant cells had a tendency to infiltrate the normal cell colony, the penetration being due to the progression of the single "sentinel" cells and occurring mostly in areas where the normal outgrowth showed gaps or lacunar arrangements. When the malignant cells met with adherent compact layers of normal cells their progression was arrested and they often shifted along the line of demarcation.

- 65-2273 CYTOGENETICS OF CARCINOMATOUS ASCITES IN GYNECOLOGY. (Sp.) Forteza Bover, G. (Dept. Genet., U. Valencia Sch. Med., Spain), R. Báguena Candela and M. Tortajada Martínez. *Rev. Esp. Obstet. Ginec.* 23(136):301-316, 1964.

In 3 cases of ovarian cancer with peritoneal carcinomatosis (age 41-67 yr.) chromosome analysis (direct method) of ascites cells showed alterations of the chromosome number and structure. There was a marked aneuploidy with 20 to 291 chromosomes per cell; the stem line modal values were 56, 67 and 42. Chromosome abnormalities consisted of fragmentation and pyknosis; also seen were giant, metacentric, telocentric, or ring chromosomes. In a pt. with tuberculous peritonitis the modal number in ascites cells was 46 chromosomes.

- 65-2274 TRACE ELEMENTS AND LEUKEMIAS. (Rus.) Leonov, V. A. (Pediat. Clin., Minsk Inst. Med., USSR). *Pediatrica* 41(2):21-24, 1963.

A discussion is presented of various abnormalities of metabolism in various leukemias; included are trace elements (cobalt and nickel), nitrogen and radioactive elements.

- 65-2275 HISTOLOGIC AND STATISTICAL STUDY OF LARYNGEAL DYSPLASIAS AND THEIR RELATIONSHIP WITH CANCERS. (Fr.) Derout, J. (Dept. Path. Anat., Boucicaut Hosp., Paris), J. De Brux and J. Leroux-Robert. *Ann. Otolaryng.* (Paris) 81(12):789-800, 1964.

Of 47 laryngeal papillomas, 2 (4.25%) presented malignant degeneration in 10 mo. and 3 yr., resp. It is concluded that benign tumors of the larynx show only a slight tendency toward malignant change (5% at the most).

- 65-2276 CHROMOSOME ABNORMALITIES IN HUMAN ACUTE LEUKEMIAS. (It.) Pegoraro, L. (Inst. Gen. Clin. Med., U. Turin, Italy) and G. Rovera. *Progr. Med. (Napoli)* 20(18):587-593, 1964.

Chromosome studies were performed by direct examination of bone marrow from untreated pts. with acute leukemia (11) and erythroleukemia (2). Of two cases of chromosome abnormalities found among 11 pts. with leukemia, one had been previously described (see CRA 2(7):#1389, 1964). The second pt. presented an extra chromosome in group VII which was identical to those of pair 21; in addition, all mitoses had another extra chromosome translocated on one of the chromosomes of pair 15. Of the 2 pts. with erythroleukemia, one showed in 90% of the cells an extra chromosome in pair 9 and the other the absence in 80% of the cells of a chromosome of group III (the pair could not be identified).

- 65-2277 H ANTIGEN DEFICIENCY IN CERTAIN SUBJECTS OF BLOOD GROUP O WITH ACUTE LEUKEMIA. (Fr.) Salmon, C. (Cent. Dept. Hemat., U. Paris Sch. Med., Sorbonne) and D. Salmon. *Rev. Franc. Etud. Clin. Biol.* 10(2):212-214, 1965.

Immunological studies were performed in 41 pts. with acute leukemia, 19 pts. with nonleukemic diseases and 24 normal subjects, all of blood group O. In normal and nonleukemic subjects the agglutinability percentage of RBC by anti-H reagent (Ulex europaeus) ranged from 71 to 95, the av. being 86. Among leukemic pts., 8/41 presented values <66% (the lowest normal value at the confidence level of 1%). Of the 8 pts., 4 had lymphoblastic, 1 myeloblastic and 3 unclassified leukemia. (See also CRA 2(7):#1388, 1964.)

- 65-2278 THE ROLE OF SEPARATE ENZYME REACTIONS IN DIFFERENT STAGES OF THE BIOSYNTHESIS OF PROTEINS IN NORMAL AND TUMOUR TISSUES. (E.) Davydova, S. J. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow), G. A. Drosdova and M. B. Saposhnikova. *Acta Un. Int. Cancr.* 20(4-5):929-931, 1964.

Transplantable and induced tumors, as well as reticulocytes, in rats and mice showed activities of pH 5 enzymes (as determined by hydroxamic acid formation and pyrophosphate exchange with ATP) which were 2-4x lower than those found in the liver. The activity of pH 5 enzymes was slightly higher in regenerating liver than in control liver. Soluble RNA amino acid binding and the rate of labeled amino acid transport to microsomes were similar in both normal and neoplastic tissues. During the first min. of incub. the rate of DL-glycine- C^{14} incorporation into the protein of microsomes was stimulated in tumors, as compared to controls. Later, however, this relationship was reversed. Thus, it is suggested that the protein turnover rate was higher in tumors than in normal tissue. (See also CRA 1(9-10):#1682, 1964.)

65-2279 CHROMOSOME ABNORMALITIES IN NEURO-BLASTOMA. (E.) Brewster, D. J. (Selly Oak Hosp., Birmingham, England) and J. V. Garrett. *J. Clin. Path.* 18(2):167-169, 1965.

A case history is presented of a 7-month-old Negro boy with a disseminated neuroblastoma whose marrow showed neuroblastoma rosettes and on direct examination on 2 occasions showed a high proportion of cells with 48 chromosomes forming an abnormal cell line.

65-2280 IMMUNISATION AND CHILDHOOD LEUKAEMIA. (E.) Innis, M. D. (Dept. Haemat., Princess Alexandra Hosp., Brisbane, Australia). *Lancet* 1:605, 1965.

From 1958-64 the charts of 59 leukemia pts. (seen in the Brisbane Children's Hospital) showed that of a possible aggregate of 177 immunizations (3/pt.) only 7 (3.95%) had not been admin. In a random control series of 343 pts. without leukemia, out of an aggregate of 1029 immunizations, 93 (9.04%) had been withheld. This difference (which is significant) suggests that human lymphoreticular tissue is possibly provoked to, or conditioned for, neoplasia by antigenic stimulation.

65-2281 IMMUNISATION AND CHILDHOOD LEUKAEMIA. (E.) Lancaster, H. O. (Dept. Math. Statist., U. Sydney, New South Wales, Australia) and F. W. Clements. *Lancet* 1:654-655, 1965.

Relative to the speculation of M. D. Innis (see preceding abstract), 2 criticisms are made: one relative to the comparability of the groups (the "control" group containing a larger proportion of children from the lower socioeconomic groups); the other questions the statistical analysis involved.

65-2282 PLEURAL FORM OF LEUKEMIA AFTER TRAUMA. (Pol.) Kirzewska, L. (1st Clin. Child. Dis., Acad. Med., Wroclaw, Poland) and J. Sassowa. *Pol. Tyg. Lek.* 18(44):1652-1653, 1963.

A case is reported of an eight-year-old girl who approx. 9 wk. before her death from acute myeloid leukemia had a history of a chest injury. A mediastinal tumor and an enlarged lymph node were subsequently treated with X-irradiation. It is suggested that the localization of the first leukemic changes may be attributable to the trauma while the rapid progress of the disease may have been promoted by the X-irradiation.

65-2283 PRECANCEROUS LESIONS. (Por.) Lodi, P. A. (Dept. Surg., U. Minas Gerais, Belo Horizonte, Brazil). *Rev. Brasil. Cir.* 48(5):325-330, 1964.

In a general survey of the most important types

of premalignant lesions, reported are one case of xeroderma pigmentosum of the lower lip with malignant degeneration, one case of malignant transformation (Marjolin's ulcer) of an old burn scar, one case of carcinoma arising in a fistula subsequent to humeral osteomyelitis, and 2 cases of carcinomatous transformation of cystic mastitis.

65-2284 CHROMOSOME ABNORMALITIES IN MULTIPLE MYELOMA. (It.) Castoldi, G. L. (Inst. Spec. Path. Med., U. Ferrara, Italy). *Haemat. Arch.* 49(10):751-766, 1964.

In a 61-year-old man with multiple myeloma a chromosome analysis of myelomatous cells revealed the consistent presence of two abnormalities in approx. half of the metaphases examined: 2 large acrocentric chromosomes with subterminal centromere (probably of Group 13-15) and 6 small acrocentric chromosomes. Also observed was the occasional presence of a large subtelocentric chromosome.

65-2285 HISTOCHEMICAL CHARACTERISTICS OF THE CONTENT AND DISTRIBUTION OF RIBO- AND DEOXYRIBONUCLEOPROTEINS IN PRECANCEROUS GROWTHS AND MAMMARY CANCER. (Rus.) Gabunia, V. A. (Inst. Exp. Morphol., Natishvili Akad. Sci., Georgian SSR). *Tr. Inst. Eksp. Morfol., Akad. Nauk Gruz. SSR (Tbilisi)* 11:215-222, 1963.

Intensity of reaction for ribonucleoproteins (RNP) increases with an increase in the immaturity of human mammary tumors (MT). RNP was higher in the more rapidly growing parts of MT. Nucleoli are rich in RNP. Compared to normal tissue, the isoelectric point of MT showed a shift in the acid direction; this shift was less pronounced in mastopathies and in fibroadenomas. During tumor growth the RNP of mitochondria was chiefly affected. In especially malignant forms of cancer a complete break between RNA and proteins was noted. With an increase in atypical forms of MT, the shape, size and amount of mitochondria were changed, and a so-called aniso- and poikilomitochondriosis was observed. Changes in the size and form of mitochondria, and also acidification of RNP of mitochondria, nucleoli and ergastoplasm are connected with chemical shifts which occurred in the tumor, and which together with changes, possibly, determined the special nature of tumor growth and development. Content of deoxyribonucleoproteins (DNP) was increased in cancerous MT as compared to mastopathy and fibroadenoma. The highest conc. of DNP was found in the zone of the tumor growth and in mitotically active tumor cells.

65-2286 THE GUILLAIN-BARRÉ SYNDROME ASSOCIATED WITH CANCER. (E.) Klingdon, G. H. (Sloan-Kettering Cancer Ctr., New York, N. Y.). *Cancer* 18(2):157-163, 1965.

Two case histories, 1 with Hodgkin's disease and the other with lung carcinoma, are presented.

65-2287 HEPATOMA STUDIES IN RAINBOW TROUT.

(E., Abstract, Ph.D. Thesis, Colorado State U., 1963, 88 pp.) Solomon, G. C. Diss. Abst. 25(7):4090, 1965.

When Shasta and Idaho rainbow trout (geographic strains) were fed a pelleted Santa Monica (SM) diet (control diet called Colorado (C)), the incidence of hepatomas at 12 mo. was significantly higher among the Shasta rainbow trout fed the SM diet than among the Idaho strain fed the SM diet or among the Shasta and Idaho strains fed the C diet. A significant Shasta strain SM diet interaction was demonstrated. The neoplasms were not transmitted by feeding hepatomatous tissue to 3-month-old rainbow trout or by inoc. supernatant fluid from hepatomatous tissue intrahaptically in 2-month-old trout. The etiologic agent appeared to be a chemical and it was suggested that the cottonseed meal and soybean meal contained in the diets may be the etiologic agent.

65-2288 CYTOGENETIC ANALYSIS OF RAT LEUKEMIA DURING ITS COURSE OF ADAPTATION TO GROWTH IN ADULT ANIMALS. (Rus.) Fichidzhian, B. S. Zhur. Eksp. Klin. Med. (Erevan, Arm. SSR) 4(1):31-38, 1964.

Transplantable rat leukemias, Strain L-37 and ILK, were studied in rats. It was found that neither the action of lyophilized tissue on the recipients nor the action of increased or decreased temperature on the transplantable cells had any effect on the oncologic and cytogenetic characteristics of leukemia. Karyotypes remained unchanged. One of three sublines which developed from this study (L-37) showed an added metacentric chromosome which remained through several transplant generations. (See also CRA 2(3):#452, 1964.)

65-2289 OCCURRENCE OF X ANTIGENIC SPECIFICITY IN HISTOCOMPATIBILITY ANTIGENS PREPARED FROM MOUSE LEUKAEMIC CELLS. (E.) Davies, D. A. L. (Microbiol. Res. Establ., Salisbury, Wiltshire, England). Brit. J. Exp. Path. 44: 546-550, 1963.

Antigen specificity called X has been shown to be carried in purified mouse histocompatibility antigens prepared from leukemic cells.

65-2290 EXPERIMENTAL INDUCTION OF LEUKOSIS IN RATS THROUGH FEEDING TESTS WITH HUMAN NEOPLASMS. II. ON THE PATHOLOGICAL CHANGES IN YOUNG ADULT RATS BY FEEDING TESTS AND NEWBORN RATS INOCULATED WITH THE FILTRATE OF THE LEUKOSIS TISSUE EXTRACT. (Jap.) Hamazaki, Y. (Inst. Hyg., Okayama Pref., Japan), S. Okumura and K. Sawayama. Saibokaku Byoriquaku Zasshi (J. Karyopath.) 9(1):1-12, 1964.

Rather than developing typical leukosis, animals with low resistance given a relatively potent inoculum may die in a pre-leukosis state with characteristic pathological changes consisting of reticuloendotheliosis of the spleen and lymph nodes, hyperemia and hemorrhage from the digestive tract. The reticulum cell neoplasm Type B (Dunn) was obtained in some of the animals. Spontaneous leukosis occasionally develops in these test-fed animals when observed for prolonged periods of time. Emulsion of the visceral organs of these test-fed animals inoc. into mature rats causes the manifestation of leukosis. (See also the following abstract.)

65-2291 EXPERIMENTAL INDUCTION OF LYMPHATIC LEUKOSIS ON RATS THROUGH FEEDING TEST WITH HUMAN CANCERS. VI. ON THE RELATIONSHIP BETWEEN THE FEEDING TEST AND THE LEUKOSIS INCIDENCE (E., Abstract) Hamazaki, Y. (Okayama Nat. Hosp., Japan). Nippon Byori Gakkai Zasshi (Trans. Soc. Path. Jap.) 53:169-170, 1964.

Feeding of human cancer tissue (1.0-3.0 g/day) to young rats (Donryu or hybrid albino) led to the development of leukosis in 11; in 10 this was transplantable. Usually, however, transplantable is difficult and is successful for only a few generations. In only 4 strains has it been possible to transplant the cancer for 6-15 mo. The author states that there is an intimate relation between the histological changes of the test-fed rat and those found in the induced leukosis; that the incidence of leukosis exceeds the spontaneous rate; that serial transmission to newborn rats is possible with the use of cell-free filtrate; and that nuclear inclusion bodies have been demonstrated in the epithelial cells of the urinary tubule and in the reticulum cells of lymph nodes. (See also CRA 2(3):#497, 1964; and ibid., 3(5):#1158, 1965.)

65-2292 MULTIPLE NEOPLASIA IN A COW. (E.) Sastry, G. A. (Dept. Path., Kansas State U., Manhattan) and M. J. Twiehaus. Indian J. Path. Bact. 7(3):199-201, 1964.

The case of a 7-year-old Hereford cow with multiple primary neoplasms (osteosarcoma of the scapula with lung metastases and cholangiocellular carcinoma of the liver) is presented.

65-2293 MECHANISM OF BLOOD-BORNE METASTASES. I. SOME FACTORS AFFECTING LODGMENT AND GROWTH OF TUMOR CELLS IN THE LUNGS. (E.) Koike, (Roswell Park Mem. Inst., Buffalo, N. Y.). Cancer 17(4):450-460, 1964.

Cell suspensions of Ehrlich diploid (ELD), Ehrlich tetraploid (ELT), Krebs 2 (K2), and sarcoma 37 (S37) ascites tumors (which were carried in Swiss mice by weekly i.p. inoc.) were inoc. i.v. into

the tail vein of cousin-mated adult male Ha/1cr Swiss mice (11 groups of 7 to 64 mice each; about 400 mice total) to study factors that may influence the lodging of tumor cells and formation of metastases in individual organs. Results indicate that the occurrence of thrombosis and the number of tumor cells larger than a critical size may be the chief factors involved in the lodging of tumor cells in the lung. Each tumor line showed a quantitative dose-response relationship with reference to the pulmonary tumor take. All tumor lines produced fewer takes in mice receiving 100 U of heparin 1 hr. before inoc., with very significant differences in the cases of ELT and S37. *In vitro* incub. of tumor cells with heparin had no anti-take effect. Assay of tumor cells circulating in blood and lodged in the lungs of cortisone-conditioned mice showed a direct relationship between the number of viable tumor cells lodging in the lungs and the number of takes. Allogeneity (a term introduced in this paper to describe the tendency of cells to cling to a foreign substrate) of the tumor cells to glass walls seemed to be correlated with their thromboplastic activity. Supernatant of tumor homogenate (STH) admin. i.v. to mice had an immediate lethal effect similar to that of i.v. admin. of thrombin. Quantitative transplantability of tumor cells in the abdominal cavity by i.p. inoc. did not parallel the tumor take after i.v. inoc. Pretreatment (i.p) of mice with STH 1 wk. prior to the i.v. inoc. of tumor cells decreased the takes significantly for all cell lines but ELT. The STH of K2 had the strongest activity, and also tended to induce splenomegaly. After inoc. with irradiated ELD, K2, or S37 cells, definite immunization responses were observed; with ELD and K2 cells, a significant decrease occurred in the number of takes per mouse but not in the number of mice with takes. (See also CRA 1(4):#669, 1963.)

65-2294 STUDY OF HUMAN CHROMOSOMES IN THE CASES OF CHRONIC MYELOLEUCOSIS AND ACUTE HEMOCYTOBLASTOSIS. (E.) Prokofjeva-Belgovskaya, A. A. (Inst. Physico-Chem. Radiat. Biol., Moscow), G. A. Kosmachevskaya, E. I. Terentyeva and I. V. Veshneva. *Hum. Chrom. Newslet.* 46(14):16-18, 1964.

Aneuploidy appeared in 40.6%, 44.7%, 77.7% and 74.2% of the cells from 4 pts. with chronic myeloid leukemia (CML), and acute hemocytoblastosis, but only in 8.9% of the cells of normal blood from 4 subjects. The Ph¹ chromosome was present in 4/4 CML pts. (in 35.1-80.2% of metaphases studied). The study was carried out during treatment with busulfan and 6-mercaptopurine.

65-2295 STUDIES ON THE CHROMOSOMES OF SARCOMA 3-B. (Jap.) Jin, H. (Dept. Path., Hirosaki U. Sch. Med., Japan). *Hirosaki Igaku (Hirosaki Med. J.)* 15(2):298-309, 1963.

The chromosomes of Sarcoma 3-B were investigated in a total of 19 samples (1,312 cells) randomly collected from serial transplants in hybrid albino rats. In the earlier generations both diploid and tetraploid types were found in almost the same numbers; a smaller number of hyperploid cells were found. In the later generations, however, the number of hyperploid cells gradually increased. The total number of chromosomes varied widely with a normal distribution curve with a peak at about 110. Most chromosomes were rod-shaped. About 30% of the cells contained large V- or J-shaped chromosomes.

65-2296 STUDIES ON THE CHROMOSOMES OF TAKEDA SARCOMA. (Jap.) Yoshida, T. (Dept. Path., Hirosaki U. Sch. Med., Japan). *Hirosaki Igaku (Hirosaki Med. J.)* 15(1):201-211, 1963.

The chromosomes of Takeda sarcoma were investigated in a total of 16 samples (1,510 cells) randomly collected from serial transplants in hybrid albino rats. The chromosome number varied widely from 34 to 167 with a normal distribution curve with the peak at about 70. The cells were diploid, tetraploid, or polyploid; 91.5% of the cells were tetraploid. Most chromosomes were rod-shaped. Large V- or J-shaped chromosomes were seen in 21%-59% of the cells.

65-2297 STUDIES ON THE CHROMOSOMES OF USUBUCHI SARCOMA IN THE SUCCESSIVE TRANSPLANTATIONS AFTER THE 200TH GENERATION. (Jap.) Takahashi, F. (Dept. Path., Hirosaki U. Sch. Med., Japan). *Hirosaki Igaku (Hirosaki Med. J.)* 15(1):239-249, 1963.

The chromosome number of Usubuchi sarcoma cells collected randomly from transplant generations 202-295 (carried in the rat) varied widely with a normal distribution curve with the peak at about 68-70. Most of the cells were tetraploid. Most chromosomes were rod-shaped but a few large V- or J-shaped chromosomes were also found. The cells of Usubuchi sarcoma were primarily of the diploid type from generations 1-10, of both diploid and tetraploid types in about equal proportions from generations 11-30, of the tetraploid type from generations 31-150, and also tetraploid, but in a lesser proportion than in the preceding group, from generations 151-300. Along with this shift in ploidy, the sarcoma changed histopathologically from spindle cell sarcoma to pure reticulum cell sarcoma.

65-2298 STUDIES ON THE CHROMOSOMES OF TETRAPLOID HIROSAKI SARCOMA PROLIFERATED FROM A SINGLE CELL. (Jap.) Ishikura, T. (Dept. Path., Hirosaki U. Sch. Med., Japan). *Hirosaki Igaku (Hirosaki Med. J.)* 15(1):168-177, 1963.

The chromosome number of cells from approx.

transplant generation 100 of the tetraploid Hiro-saki sarcoma (originally derived from a single cell and carried in the rat) varied widely; the normal distribution curve had a peak at about 70-71. Morphological analysis of the chromosomes revealed that the chromosome complex consisted mostly of rod-shaped chromosomes. Large V- or J-shaped chromosomes were seen in 8%-21% of the cells. The author states that these findings do not essentially differ from those of a study of the same sarcoma not derived from a single cell (see the following abstract).

- 65-2299 STUDIES ON THE CHROMOSOMES OF TETRA-PLOID HIROSAKI SARCOMA. (Jap.) Tazawa, S. (Dept. Path., Hirosaki U. Sch. Med., Japan). Hirosaki Igaku (Hirosaki Med. J.) 15(1): 130-138, 1963.

The chromosomes of tetraploid Hirosaki sarcoma (carried in hybrid albino rats) were investigated in a total of 12 samples (1,050 cells) randomly collected from transplant generations 101-200. The number of chromosomes varied from 53-98 with a normal distribution curve with a peak at 70-72. The chromosomes were mostly rod-shaped. Large V- or J-shaped chromosomes were seen in 16%-42% of the cells; no correlation was found between the presence of these chromosomes and the total number of chromosomes.

- 65-2300 STUDIES ON THE CHROMOSOMES OF DIPLOID HIROSAKI SARCOMA PROLIFERATED FROM A SINGLE CELL. (Jap.) Narita, N. (Dept. Path., Hirosaki U. Sch. Med., Japan). Hirosaki Igaku (Hirosaki Med. J.) 15(1):149-156, 1963.

The chromosomes of diploid Hirosaki sarcoma, originally derived from a single cell, were investigated in a total of 12 samples (1,150 cells) randomly collected from 116 serial transplant generations carried in hybrid albino rats. The number of chromosomes varied widely with a normal distribution curve with the peak at about 37. Most of the chromosomes were rod-shaped. Large V-shaped chromosomes were seen in 22%-39% of the cells but no definite correlation was found between their number and the total number of the chromosomes.

- 65-2301 EXPERIMENTAL STUDY ON THE DEVELOPMENT AND EVOLUTIONAL PROCESS OF LEUKEMIA IN MICE FROM PATHOLOGICAL POINT OF VIEW. I. ON THE SPONTANEOUSLY OCCURRING LEUKEMIA IN THE C58 SUBSTRAIN AND AKR STRAIN OF MICE. (Jap.) Sato, H. (1st Dept. Intern. Med., Fukushima Coll. Med., Japan). Fukushima Igaku Zasshi (Fukushima Med. J.) 12(6):445-454, 1963.

Histopathologic manifestations were compared in two strains of mice with widely varying incidences of spontaneous leukemia: C58 with a low rate, and in AKR with a high rate. Certain characteristic

manifestations such as predominant involvement of the lymph nodes, spleen and liver in the leukemia of the C58 mice in contrast to the involvement of the thymus in AKR mice indicate the participation of genetic factors in these leukemias. (See also CRA 1(4):#700; and ibid., (5):#922, 1963.)

- 65-2302 A KARYOLOGICAL STUDY ON MOUSE LEUKEMIA WITH SPECIAL REFERENCE TO COMPARATIVE ANALYSES OF CHROMOSOMES IN SOMATIC AND LEUKEMIC CELLS. (Jap.) Abe, K. (1st. Dept. Intern. Med., Fukushima Coll. Med., Japan). Fukushima Igaku Zasshi (Fukushima Med. J.) 13(3-4):79-96, 1963.

In a karyological study of leukemic cells in the liver, spleen, thymus and lymph nodes of AKR mice (5 males and 5 females) with spontaneous leukemia, while the mode of the chromosome number was 40 (as in normal AKR cells), the range was from 39-42. In some mice, two different chromosome numbers were coexistent, and in other cases cells with two different chromosome numbers formed mosaic patterns. No specific morphological abnormality was found. Aneuploid cells, therefore, were considered to result from nondisjunction or lagging and to proliferate individually. At the present stage, euploid leukemic cells failed to be differentiated karyologically from non-leukemic cells. In leukemic cells, the Y sex chromosome was confirmed but whether there is any abnormality in the X chromosome was not determined. (See also CRA 1(4):#700, 1963.)

- 65-2303 HISTOPATHOLOGICAL STUDY ON GASTRIC POLYPS AND THEIR MALIGNANT DEGENERATION. (E.) Majima, S. (Dept. Surg., Tohoku U. Sch. Med., Sendai, Japan), K. Yoshida, T. Teshima and K. Karube. Tohoku J. Exp. Med. 80:355-369, 1963.

Of 71 cases of gastric polyp (41 single, 28 multiple, 2 polyposis) resected during the last 22 yr., malignant degeneration was seen in 13 cases; in 4/13, the malignant and non-malignant polyps coexisted with an advanced carcinoma of Borrmann's Type I or II. The majority of the polyps with early malignant degeneration showed histological Type II (the incompletely developed polyp) and only 1 case was of Type III (the well developed polyp). It is presumed that the cancerous tissue originated on the superficial portion and proliferated towards the gastric lumen, showing less marked deep infiltration.

- 65-2304 SPONTANEOUS REGRESSION OF CANCER. (E.) Fullerton, J. M. and R. D. Hill. Brit. Med. J. 2:1589-1590, 1963.

At gastrectomy, a carcinoma of the stomach which infiltrated the transverse mesocolon was found in a 58-year-old woman; at a later laparotomy this mass was diagnosed as an anaplastic adenocarcinoma. The pt. died 16 yr. later from bronchopneumonia. At autopsy the g.i. tract showed no evidence of carcinoma.

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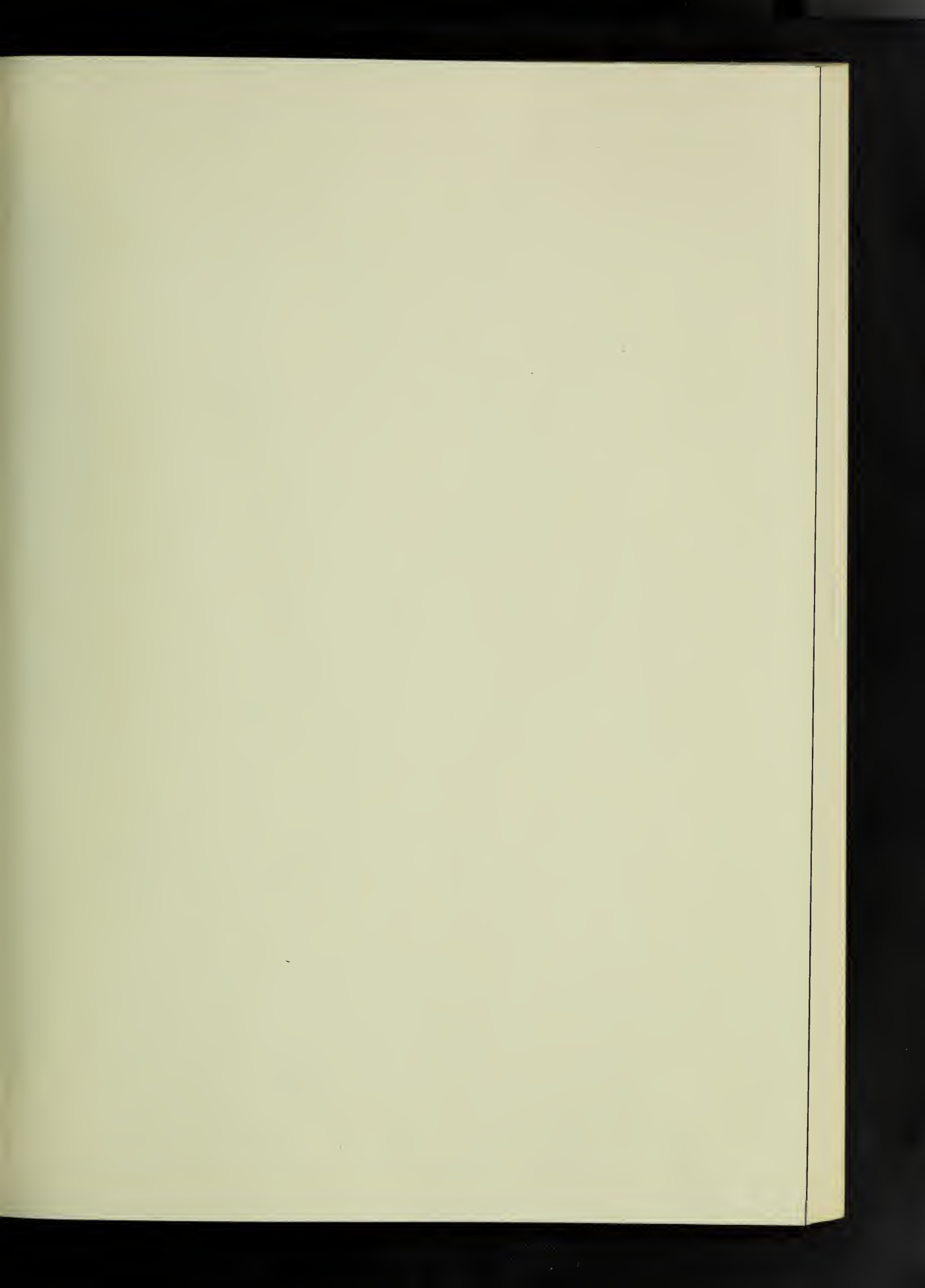
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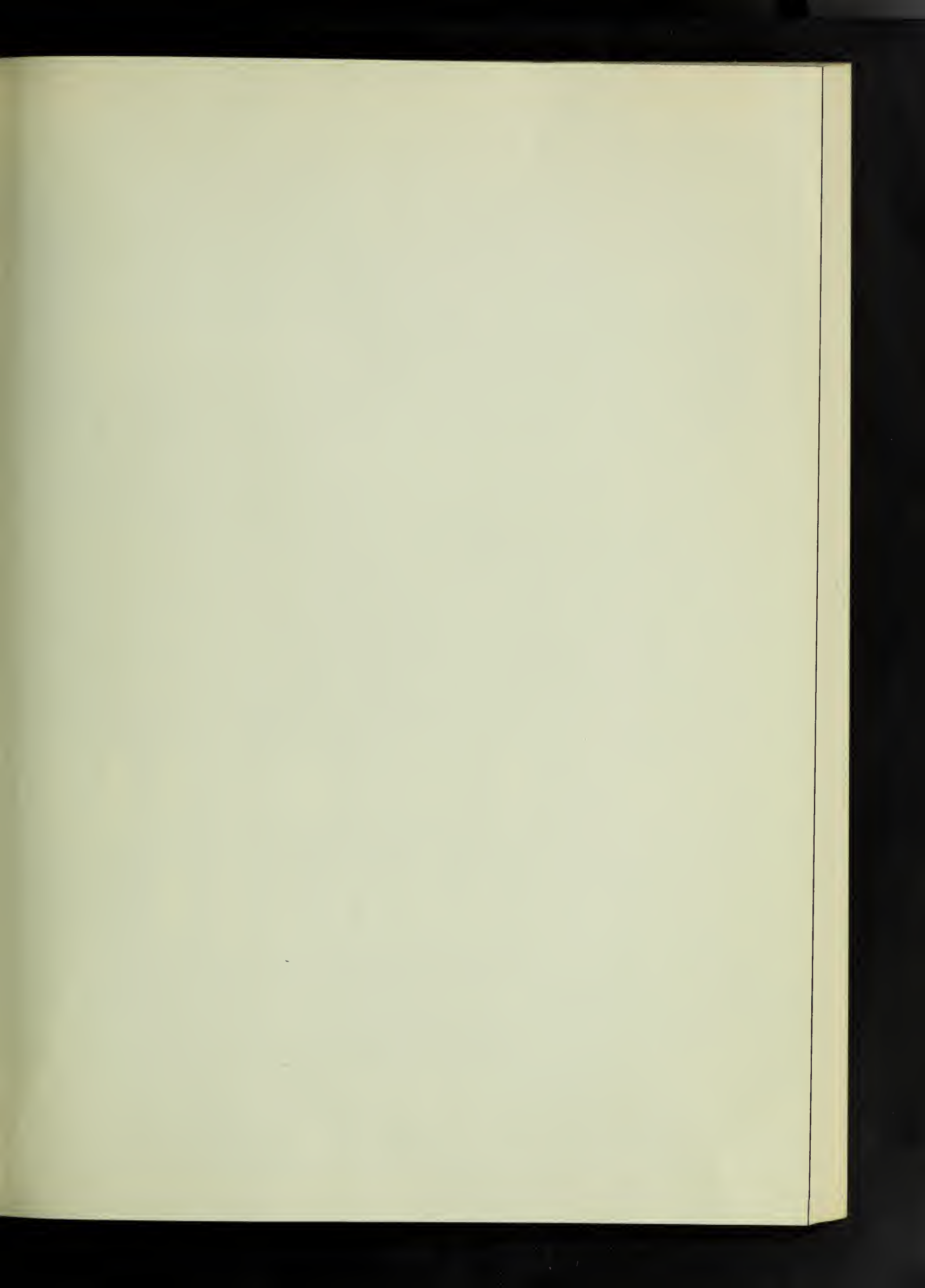
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Vol. 3

CARCINOGENESIS ABSTRACTS

National Cancer Institute

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Public Health Service

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September 1965

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Publication of this alerting service is terminated with this issue (Volume 3, Subject-Author Index), pending a thorough evaluation of its impact on the research and educational communities.

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Ian A. Mitchell, M.D.
Special Assistant to Associate
Director for Field Studies
National Cancer Institute
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Bethesda, Maryland 20014

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Ian A. Mitchell".

Ian A. Mitchell, M.D.

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 Kirschstein, R. L. 1140,1981
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 Kopf, A. W. 1224
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 Koprowska, I. 1907
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 Kowalczykova, J. 1950
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 Levin, M. L. 1905
 Levin, S. 1670
 Levin, W. C. 369,923
 Levinthal, J. D. 1166,1980
 Levy, J. P. 122,530,855,
 1316,1334,1498,1987
 Lew, V. 1918
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 Lewis, F. J. W. 360
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 Li, K.-H. 891
 Li, M.-H. 1884
 Liang, P. C. 569
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 Libánský, J. 362,1763,1764
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 Liebelt, A. G. 1103,1866
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 Maloof, E. C. 563
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 Mangakis, N. 1791
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 Sekhri, K. K. 1958
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 Shibata, T. 159
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 Shigemitsu, T. 344
 Shiki, T. 1998
 Shimizu, J. 1047
 Shimizu, K. 138,349
 Shimizu, T. 379,1932,1969
 Shimkin, M. B. 13,470
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 Shone, G. 491
 Shuba, E. P. 1895
 Shubik, P. 85,250,490,1449 1803,1869
 Shullenberger, C. C. 803
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 Sirtori, C. 1322
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 Tashiro, K. 1047
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 Tazawa, S. 2299
 Tchakhline, A. 1234
 Tchan-Dgin-Dun 1888
 Tchiiri, H. 1351
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 Thomas, J. A. 534,535,543
 Thomas, M. 122,1987
 Thomas, T. F. 953
 Thompson, J. E. 1661
 Thompson, S. J. 1462
 Thomson, A. D. 124,893
 Thomson, J. A. 1771
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 Tolev, I. 181
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 Tomatis, L. 85,1818
 Tomb, J. 1913
 Tomie, K. 1237
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 Tomonaga, M. 350
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 Toplin, I. 1961
 Toranzo, J. C. 1247
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 Treger, A. 475
 Trentelman, E. F. 960
 Trentin, J. J. 834,1153, 1164,1177
 Treves, N. 2014
 Tridente, G. 60,61,1383
 Trivella, U. 2064
 Troll, W. 1108,1115
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 Ts'ai, H.-Y. 1884
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 Turkington, R. W. 2021
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 Umbarger, H. E. 2103
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 Voisin, R. 2084
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Závadová, Z. 1983
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ERRATA:

- 2(4):#803, 1964. Line 17 change normal to X-imm.
- 2(6):#1189, 1964. Lines 9-10 change latter part of sentence to read: or in 39 axenic mice inoc. with axenic tissue and observed over the same period.
- 3(4):#923, 1965. Lines 6-7 change including 2 near-tetraploid cells to including a near-tetraploid cell.
- 2(6):#1068, 1964. First sentence, substitute Group II for Group I and Group I for Group II.
- 3(4):#706, 1965. Delete part of first sentence after irradiation injury (line 5). Add: Sputum smears of students with case histories of radiation therapy served as controls.
- 3(4):#895, 1965. Line 4: change the prostate to prostatitis.
- 3(6):#1451, 1965. Line 1: Change first word to Intact.
- 3(6):#1397, 1965. Delete last sentence.

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